AAC™ Installation Guide

AAC-3®
AAC-2™
CellSMART® 200

Document #1193282

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REVISION HISTORY

PART #	DATE	DESCRIPTION
65-10000001	January, 1996	Issue 1
65-10000002	July, 1996	Issue 2
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65-10000004	June, 1998	Issue 4
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1132595	July, 2001	Issue 6, combined AAC-2 and AAC-3 versions and updated content for 3.0.0.
1193282	October, 2001	Issue 7, Release 3.1.0. Added SDM and Quad TTL support.

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ABOUT THIS MANUAL

This manual describes how to perform an initial installation, power up, basic configuration, and verification of an AAC-2/3 chassis. Note that the CellSMART 200 utilizes the AAC-2 chassis. Throughout the rest of the manual the term AAC will be used in place of AAC-2/3 and CellSMART 200. This manual contains the following information:

- Chapter 1: Getting Started describes site and environmental requirements and shows how to unpack and inspect the shipment.
- Chapter 2: Initial Installation and Power Up explains how to mount the chassis on a desktop or in a standard equipment rack, how to connect a terminal to the AAC communication port, how to power up both AC and DC models, and how to log into the AAC.
- Chapter 3: Connecting Cables shows how to connect cables to the various ports and specifies which cables and connectors to use.
- Chapter 4: Adding/Replacing Components shows how to install new modules or replace the power supply in the AAC.

This manual also contains several appendices.

Refer to the *AAC User's Guide* for module specifications, LED descriptions, instructions for updating your software, and instructions for saving and restoring your system configuration.

RELATED PUBLICATIONS

Listed below are related manuals and their publication numbers. These publications can be obtained from the Kentrox Web site at http://www.kentrox.com/aac or ordered by contacting Kentrox Customer Service.

Title/Description	Part Number
ISC Upgrade Instructions Instructions for replacing the System Controller and Extension Module with the Integrated System Controller. It describes saving your existing SC configuration and restoring it on the ISC.	**5000089**
AAC Planning Guide An overview of the features of the AAC, sample network topologies, and worksheets for planning the AAC configuration.	**1193281**
AAC User's Guide This guide provides background information about ATM, network connection theory, and the internal operations of the AAC, as well as guidelines for configuring connections and complete information about all features of the user interface. The *AAC User's Guide* also contains troubleshooting information.	**1193284**

VIEWING THIS MANUAL AS A PDF FILE

This manual is designed to be used as both a printed book and a PDF file, and includes the following features for PDF viewing:

- Cross-references are clickable hyperlinks that appear in blue text.
- Chapters and section headings are represented as clickable bookmarks in the left-hand pane of the Acrobat viewer.
- Page numbering is consistent between the printed page and the PDF file to help you easily select a range of pages for printing.

You can obtain PDF files of our manuals by visiting http://www.kentrox.com.

CONVENTIONS USED IN THIS MANUAL

This manual employs the following conventions when explaining command-line syntax:

Literals	Bold type identifies commands and syntax elements that must be entered exactly as shown in the text.
Variables	Italic type identifies variable syntax elements, such as values or alphanumeric strings that can be entered.
x|y	A vertical line between elements means that the elements are mutually exclusive; one and only one of the elements can be selected.
[ ]	Brackets indicate items that are optional.

MIB SOURCE FILES AND SOFTWARE UPDATES

The MIBs and software updates are available via anonymous FTP or via the World Wide Web from the following sites:

ftp://ftp.kentrox.com
http://www.kentrox.com/aac

WHO TO CALL FOR ASSISTANCE

If you need assistance with this product or have questions not answered by this manual, please visit our Support page on the Kentrox Web site. You are also welcome to call or send email to our Technical Assistance Center. Please have your product's software revision and hardware serial numbers available to give to the Support representative. All product returns must include a Return Authorization number, which you can obtain by calling the Technical Assistance Center.

The numbers listed below are current at the time of publication. See the Kentrox Web site for detailed contact and warranty information.

1-800-733-5511 (continental USA only)
1-503-350-6001
email: support@kentrox.com
http://www.kentrox.com

ADMONISHMENTS

Important safety admonishments are used throughout this manual to warn of possible hazards to persons or equipment. An admonishment identifies a possible hazard and then explains what may happen if the hazard is not avoided. The admonishments — in the form of Dangers, Warnings, and Cautions — must be followed at all times. These warnings are flagged by use of the triangular alert icon (seen below), and are listed in descending order of severity of injury or damage and likelihood of occurrence.

Danger: *Danger is used to indicate the presence of a hazard that* ***will*** *cause severe personal injury, death, or substantial property damage if the hazard is not avoided.*

Warning: *Warning is used to indicate the presence of a hazard that* ***can*** *cause severe personal injury, death, or substantial property damage if the hazard is not avoided.*

Caution: *Caution is used to indicate the presence of a hazard that* ***will*** *or* ***can*** *cause minor personal injury or property damage if the hazard is not avoided.*

GENERAL SAFETY PRECAUTIONS

Warning: *To avoid hazard from electrical shock and/or fire, adhere to the safety practices listed in this section and identified within the instructions of this document.*

If a DC Power Supply is installed in an AAC-2 chassis, the chassis must be located in a restricted-access area (such as a dedicated equipment room, equipment closet, or the like) in accordance with Articles 110-16, 110-17, and 110-18 of the national electrical code, ANSI/ NFPA No. 70.

There are potentially hazardous voltages inside the chassis. Service should be performed only by trained and qualified personnel.

The OC-3c single-mode module is a Class 1 LASER device. Avoid eye exposure to module connector or cable ends.

COMPLIANCE STATEMENTS

FCC Part 68 Requirements

This equipment complies with Part 68 of the FCC rules. On the side of the chassis is a label that contains, among other information, the FCC registration number for this equipment. The registration number F8I USA 23268-XD-N applies to Model 10302 Quad DSX-1 PLM, Model 10303 Tri V.35/EIA-530 & DSX-1 PLM, and Model 10315 Octal DSX-1 PLM. The registration number F8I USA-24409-DS-N applies to Model 10312 T1 IMA PLM, Model 10317 Octal DS1, and Model 10318 Octal T1 IMA PLM. This AAC-3 may be equipped with one, both, or none of these types of registered interfaces. Upon request of the telephone company, you should provide the FCC registration number of the equipment which is connected to your line.

This equipment operates with a 1.544 Mb/s digital channel.

The Service Order Code is 6.0N. The Facility Interface Code is 04DU9-BN for lines using Super Frame format, 04DU9-DN for lines using Super Frame format and B8ZS, 04DU9-1KN for lines using the Extended Super Frame format, and 04DU9-1SN for lines using Extended Super Frame format and B8ZS. The AAC-3 with T1 IMA PLM (10312 or 10318) connects to the network using a USOC RJ48C jack. The AAC-3 with 10302 or 10303 PLMs requires the use of a registered CSU for connection to the public network.

The telephone company must be notified before removal of an AAC-3 connected 1.544 Mb/s digital service. If the telephone company notes a problem they may temporarily discontinue service, and notify you of this disconnection. (If advance notice is not feasible, you will be notified as soon as possible.) When you are notified you will be given the opportunity to correct the problem and informed of your right to file a complaint with the FCC.

The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make the necessary modifications in order to maintain uninterrupted service. Normally, the AAC-3 will be used in conjunction with FCC registered equipment that limits the Encode Analog Content and provides the required Billing Protection. If the connected equipment is not of this type, an affidavit must be supplied to the telephone company where the network connection is to be made. The affidavit is to be notarized, and is to be filed at least ten days before the initial connection.

If trouble is experienced with this equipment, please contact Kentrox for repair and warranty information. The central number for calls originating in the U.S.A. or Canada is **1-800-733-5511**. For calls originating outside the U.S.A. or Canada, dial country code “1” then **503-350-6001**.

If this equipment is causing harm to the telephone network, the telephone company may request you remove the equipment from the network until the problem is resolved.

All repairs should be handled by authorized Kentrox service personnel.

FCC Part 15 Requirements

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interferences to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

NRTL Listing

This equipment has been tested by a Nationally Recognized Testing Laboratory (NRTL) and is in compliance with Underwriters Laboratories (UL) Standard 1950 Edition 3.

cNRTL Certification

This equipment is certified by a Canadian NRTL to CAN/CSA-C22.2 no. 950-M89, Safety of Information Technology Equipment, Including Electrical Business Equipment, with Telecommunications Features.

Canadian Telecommunications

This equipment meets the requirements of CS-03.
Terminal Equipment Certificate number: 14558.
Certification number: 1208 7073A.

This equipment does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the Radio Interference Regulations of Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques Classe A prescrite dans le règlement sur le brouillage Radioélectrique édicté par Communications du Canada.

GOST

This equipment is certified by DIN GOST TÜV Berlin-Brandenburg to meet the requirements of GOST R 50377-92, GOST 29216-91, and GOST R 50839-95. The certificate of conformity, No. POCC US. Д E01.B03353, covers the AAC-3, AAC-2, and CellSMART 200 series products. The certificate has legal power in the entire territory of the Russian Federation.

European Conformance

CE

The original Declaration of Conformity for this product is available at http://www.kentrox.com/conformance.

The AAC-3 is compliant with: EN60950, EN41003, EN55022 class B, EN50082-1, CTR12, TBR13, UK NTR 4, and UK NTR 6.

The AAC-3 is in conformance with the EMC directive, 89/336/EEC, the Telecommunications Terminal Directive, 91/263/EEC and the Low Voltage Directive, 73/23/EEC.

Declaration of Conformity: Kentrox declares that the AAC-2/AAC-3 is in conformance with the essential requirements and all relevant clauses of the directive 1999/5/EC.

Konformitetserklæring: Hermed erklærer Kentrox at indestående AAC-2/AAC-3 er i overensstemmelse med de grundlæggende krav og de relevante punkter i direktiv 1999/5/EF.

Konformitätserklärung: Hiermit erklärt Kentrox dass der AAC-2/AAC-3 die grundlegenden Anforderungen und sonstige maßgebliche Bestimmungen der Richtlinie 1999/5/EG erfüllt.

Vaatimustenmukaisuusvakuutus: Kentrox vakuuttaa täten, että AAC-2/AAC-3 on direktiivin 1999/5/EC keskeisten vaatimusten ja sen muiden tätä koskevien säännösten mukainen.

Déclaration de conformité: Par la présente, Kentrox déclare que ce routeur AAC-2/AAC-3 est conforme aux conditions essentielles et à toute autre modalité pertinente de la Directive 1999/5/CE.

Dichiarazione di conformità: Con la presente Kentrox dichiara che il AAC-2/AAC-3 soddisfa i requisiti essenziali e le altre disposizioni pertinenti della direttiva 1999/5/CE.

Verklaring van overeenstemming: Hierbij verklaart Kentrox dat diens AAC-2/AAC-3 voldoet aan de basisvereisten en andere relevante voorwaarden van EG-richtlijn 1999/5/EG.

Declaração de Conformidade: Através da presente, a Kentrox declara que este encaminhador AAC-2/AAC-3 se encontra em conformidade com os requisitos essenciais e outras disposições relevantes da Directiva 1999/5/CE.

Declaración de conformidad: Por la presente declaración, Kentrox declara que este encaminador AAC-2/AAC-3 cumple los requisitos esenciales y otras cláusulas importantes de la directiva 1999/5/CE.

Överensstämmelseförklaring: Kentrox förklarar härmed att denna AAC-2/AAC-3 överensstämmer med de väsentliga kraven och övriga relevanta stadganden i direktiv 1999/5/EG.

Πιστοποίση Συμμόρφωση: Η εταιρία Kentrox δηλώνει ότι το προϊόν AAC-2/AAC-3 τηρεί τις βασικές απαιτήσεις και όλα τα σχετικά άρθρα της οδηγίας 1999/5/EC.

EQUIPMENT ATTACHMENT LIMITATIONS

CP-01
1.10.1
NOTICE: The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

⚠ **Caution:** *Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.*

CP-01
1.10.2

The **Load Number** (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the total of the Load Numbers of all the devices does not exceed 100.

LIST OF ACRONYMS AND ABBREVIATIONS

AAL	ATM Adaptation Layer
ABR	Available Bit Rate
ACO	Alarm Cut Off
ADM	Add / Drop Multiplexer
AIS	Alarm Indication Signal
AMI	Alternate Mark Inversion
ANSI	American National Standards Institute
APS	Automatic Protection Switch
ATM	Asynchronous Transfer Mode
ATMF	ATM Forum
AWG	American Wire Gauge
B3ZS	Bipolar Three Zero Substitution
B8ZS	Bipolar Eight Zero Substitution
BECN	Backward Explicit Congestion Notification
BITS	Building Integrated Timing Supply
bps	Bits per second
BPV	Bipolar Violation
CAC	Connection Admission Control
CBR	Constant Bit Rate
CDV	Cell Delay Variation
CDVT	Cell Delay Variation Tolerance
CES	Circuit Emulation Service
CEV	Controlled Environmental Vault
Ch.	Channelized (as in Channelized DS1)
CI	Customer Interface
CIR	Committed Information Rate
CKT	Circuit
CLP	Cell Loss Priority
CO	Central Office
CPE	Customer Premise Equipment
CRC	Cyclic Redundancy Code
CRS	Cell Relay Service
CSA	Carrier Serving Area
CSS	Controlled Slip Seconds
CSU	Channel Service Unit
CTC	Common Transmit Clock
CTD	Cell Transfer Delay
CTS	Clear to Send
CV	C-bit Coding Violations
CVL	Line Coding Violations
DACS	Digital Access and Cross-connect System

DCD	Data Carrier Direct
DCE	Data Communications Equipment
DCS	Digital Cross-connect System
DE	Discard Eligible
DLP	Detailed Level Procedure
DLX	DS1 Loop Extender
DLCI	Data Link Connection Identifier
DS1	Digital Signal, Level 1, T1
DS3	Digital Signal Level 3, T3
DSR	Data Set Ready
DTE	Data Terminal Equipment
DTR	Data Terminal Ready
DXI	Data Exchange Interface
E1	CEPT Format Level 1
EFCI	Explicit Forward Congestion Indication
EIA	Electronics Industries Association
EMI	Electromagnetic Interference
EMS	Element Management System
EPD	Early Packet Discard
ES	Errored Second
ESC PM	Enhanced Shaping Cell Protocol Module
ESD	Electrostatic Discharge
ESF	Extended Super Frame
ESL	Line Errored Seconds
ETSI	European Telecommunications Standards Institute
FC	Fiber-optic Connector
FCC	Federal Communications Commission
FCS	Frame Check Sequence
FDL	Facility Data Link
FE1	Fractional E1 FRS
FECN	Forward Explicit Congestion Notification
FRS	Frame Relay Service
FT1	Fractional T1 FRS
GCRA	Generic Cell Rate Algorithm
GFC	Generic Flow Control
GND	Ground
GUI	Graphical User Interface
HDB3	High Density Bipolar 3
HDLC	High Level Data Link Control
HEC	Header Error Control
HSSI	High Speed Serial Interface
IMA	Inverse Multiplexing for ATM

ISC	Integrated System Controller
LAN	Local Area Network
LEC	Local Exchange Carrier
LED	Light Emitting Diode
LL	Local Loopback
LLC	Logical Link Control
LMI	Local Management Interface
LOF	Loss of Frame
LOP	Loss of Power
LOS	Loss of Signal
MBS	Maximum Burst Size
MIB	Management Information Base
MM	Multi-mode
MON	Monitor
msec	millisecond
NE	Network Element
NIC	Network Interface Card
NID	Network Interface Device
NMS	Network Management System
NNI	Network to Network Interface
NPC	Network Parameter Control
NRZ	Non-return to Zero
OAM	Operations, Administration, and Maintenance
OSS	Operations Support System
PBX	Private Branch Exchange
PCR	Peak Cell Rate
PCV	Path Coding Violations
PDU	Protocol Data Unit
PLCP	Physical Layer Convergence Protocol
PLM	Physical Layer Module
PM	Protocol Module
POP	Point of Presence
PPD	Partial Packet Discard
ppm	Parts per million
PVC	Permanent Virtual Circuit
QoS	Quality of Service
RCV	Receive
RL	Remote Loopback
RMA	Return Material Authorization
ro	Read Only
RTS	Request To Send
rw	Read Write

SCR	Sustainable Cell Rate
SDH	Synchronous Digital Hierarchy
SDM	Service Data Module
SEFS	Severely Errored Frame Seconds
SES	Severely Errored Seconds
SF	Super Frame
SM	Single Mode
SMDS	Switched Multi-megabit Data Service
SNAP	Subnetwork Access Protocol
SNMP	Simple Network Management Protocol
SONET	Synchronous Optical NETwork
SPE	Synchronous Payload Envelope
STM	Synchronous Transport Mode
STS	Synchronous Transport Signal
STS-3c	Concatenated STS-3 signal (one payload)
su	Super User
SVC	Switched Virtual Circuit
T1	Digital Signal Level 1
T3	Digital Signal Level 3
TAP	Trouble Analysis Procedure
TCP/IP	Transmission Control Protocol/Internet Protocol
TDM	Time Division Multiplexed
TM	Test Mode
UAS	Unavailable Seconds
UBR	Unspecified Bit Rate
UL	Underwriters Laboratories, Inc.
UNI	User Network Interface
UPC	Usage Parameter Control
VAC	Voltage Alternating Current
VBR	Variable Bit Rate
nrt-VBR	non-real-time Variable Bit Rate
rt-VBR	real-time Variable Bit Rate
VC	Virtual Circuit or Virtual Channel
VCC	Virtual Channel Connection
VCI	Virtual Channel Identifier
VDC	Voltage Direct Current
VP	Virtual Path
VPC	Virtual Path Connection
VPI	Virtual Path Identifier
WAN	Wide Area Network
WFQ	Weighted-Fair Queuing
XMT	Transmit

CHAPTER 1: GETTING STARTED

This section describes how to prepare for the installation of an AAC. Topics include:

- Selecting an appropriate installation site
- Unpacking the shipping cartons and inspecting their contents to ensure there is no shipment damage
- Taking inventory of the cartons contents to ensure that all required components have been received

After reading this section, install the main components as described in Chapter 2.

1.1 SELECT AN APPROPRIATE SITE

The installation site for the AAC must meet certain requirements for safety, power and grounding, ambient temperature and humidity control, physical space, and electrostatic protection.

1.1.1 Controlling Access

The AAC chassis features a removable front cover that allows access to an internal modular card cage. The internal card cage has energy levels that may exceed 240 VAC, therefore, the chassis front cover is intended to be removed only by qualified service personnel. Procedures in this manual that require removal of the front cover and/or the removal of modules or power supplies are intended to be performed only by qualified service personnel.

In addition, if the AAC-3 is installed in an non-controlled access location and the chassis has two installed power supplies, front-panel latch guards must be installed. These guards prevent the chassis front cover from being easily removed. They help ensure limited access to the chassis and are a safety requirement in a non-controlled access location.

A controlled access area must be readily accessible to equipment operators as well as equipment service personnel. In a controlled access location, it is not necessary to install the front-panel latch guards.

Warning: *When two power supplies are installed in an AAC-3 chassis, energy levels in the internal card cage may exceed 240 VAC. Access to the internal chassis card cage is restricted to trained and qualified service personnel. If the chassis is installed in a non-controlled access location, the chassis front-panel latch guards must be installed as instructed in Chapter 4 of this manual.*

1.1.2 Power

The AAC operates from either AC or DC power, depending on the type of power supplies installed. Make sure that the installation site provides the appropriate power source. The power requirements and the voltage tolerances are listed below.

Two AC power supplies are available:

- For North America: 120 VAC, 60 Hz nominal, 8.0 A maximum (100 to 132 VAC maximum operating range)
- For other sites: 220 VAC, 50 Hz nominal, 4.0 A maximum (190 to 264 VAC maximum operating range)

When using an AC supply, the AC branch circuit receptacle should be located near the equipment and should be easily accessible. Do not attach the power supply cord to building surfaces.

One DC power supply is available: -48 VDC nominal, 9.0 A maximum (42 to 60 VDC maximum operating range).

The output for the power supplies is:

- AAC-3
  - 250 W maximum for AC power supplies
  - 300 W maximum for DC power supply
- AAC-2
  - 250 W maximum for AC power supplies
  - 300 W maximum for DC power supply

Caution: *Damage to the AAC chassis or its installed components may occur if the input voltage applied to the chassis is not within the specified range.*

1.1.3 Grounding

The chassis is grounded through its power supply connector. The AC power supply is designed to connect to a power source that has a protective-ground contact. It is grounded through a grounding conductor in the power cord. The DC supply is grounded by attaching facilities ground to the ground terminal on the supply.

1.1.4 Environmental Ranges

The work area selected for the AAC must fall within the following environmental limits:

- Nominal operating temperature: 32° F to 104° F (0° C to 40° C)
- Storage temperature: -40° F to 150° F (–20° C to 66° C)
- Humidity: 5% to 95% RH, non-condensing

Caution: *Electrostatic discharge (ESD) is potentially damaging to circuitry in the AAC. Set up the work area to limit the effects of ESD. We recommend that you wear a ground strap when handling the modules and that you employ antistatic mats within the work area.*

1.1.5 Space Requirements

The external dimensions of the chassis are shown in Figure 1 and Figure 2.

The AAC-2 chassis has fan exhaust vents in the left side and rear panels and an air intake vent in the right side panel. Clearances of 0.50 in. (12.7 mm) to the left and right side panels and 3 in. (76.2 mm) to the rear of the chassis are required for air flow and cooling.

Note: When an AAC-2 chassis is mounted in an EIA standard rack, the rack column partially blocks the fan (about one-third of the area). This is acceptable and does not create a cooling problem.

The AAC-3 chassis has vents in its left side-panel and fans in the top and in each power supply. Clearances of 0.10 in. (2.5 mm) to the left and 3 in. (76.2 mm) to the rear of the chassis are required for air flow and cooling.

Note: Remember to allocate sufficient space behind the chassis for module removal/ replacement, visual inspection of all interface LEDs, and other maintenance tasks.

If the chassis is mounted on a desktop, the chassis feet provide enough clearance on the bottom. If the chassis is installed in an equipment rack, a minimum of at least one rack unit (RU)— 1.75 in. (44.5 mm)— of space should be left below the chassis.

Caution: *Damage to the chassis or its installed components may occur if appropriate clearances are not provided for cooling.*

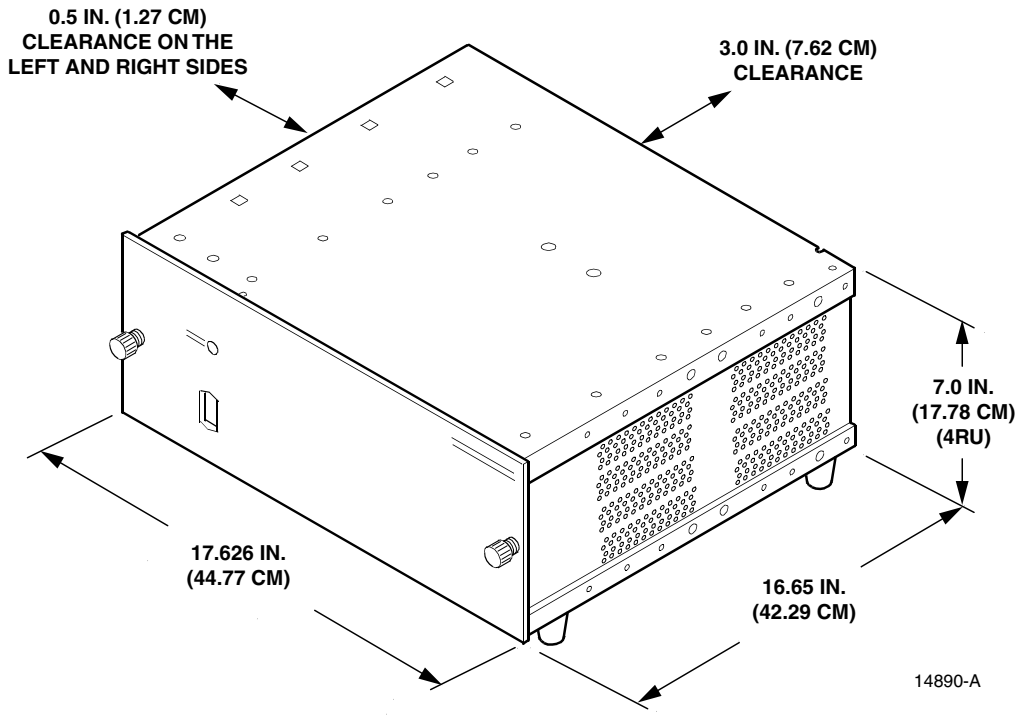


Figure 1: AAC-2 Chassis dimensions and ventilation clearance requirements

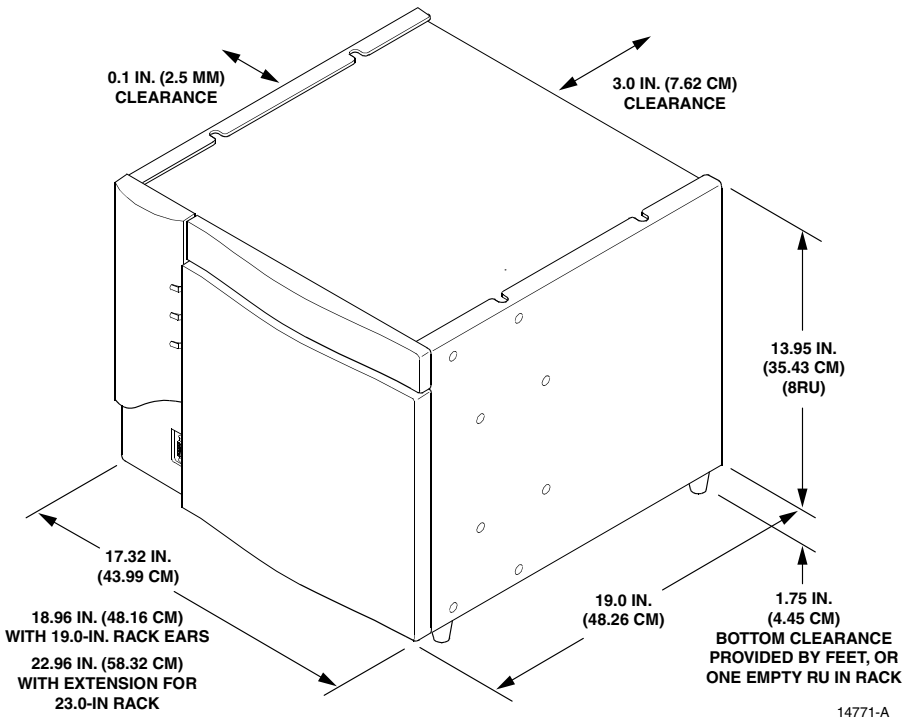


Figure 2: AAC-3 chassis dimensions and ventilation clearance requirements

1.2 UNPACK THE AAC

Once the installation site has been selected, unpack the AAC shipment. Inspect the shipment carefully to ensure that there is no shipping damage.

Start by inspecting the shipping cartons for shipping damage. If there is evidence of damage to the cartons, notify the shipping carrier and call the Kentrox Technical Assistance Center as described on page 7.

1.2.1 Standard Accessories

If the cartons show no damage, unpack the shipment. There should be a large carton that contains:

- The AAC chassis, with installed Integrated System Controller (ISC) and optional Alarm module.
- Rack-mount ears for 19 in. rack (pre-installed)
- Front-panel latch guards, AAC-3 only
- The AAC documentation set

1.2.2 Optional Accessories

Protocol Modules (PMs), Physical Layer Modules (PLMs), and power supplies are installed in the chassis at the factory if ordered as part of a pre-configured system. If they are ordered as separate components, they are shipped in separate cartons.

Depending on the order, several smaller cartons that contain optional accessories such as physical layer port cables and adapters or power cords, or a rack extension for a 23 in. rack may be shipped. At a minimum, the following optional accessories are required:

- A serial COMM port cable (PC AT-type compatible)
- An interface cable for each physical layer interface
- An AC power cord (AC powered chassis only)

If these accessories have not been ordered, refer to Chapter 3 for a description of cables and adapters available for the various types of interface ports. See Chapter 2 for a list of available COMM port cables. In addition, Kentrox Application Support can be contacted at the telephone numbers listed on page 7 for a complete list of AAC accessories.

Figure 3 illustrates the major AAC components.

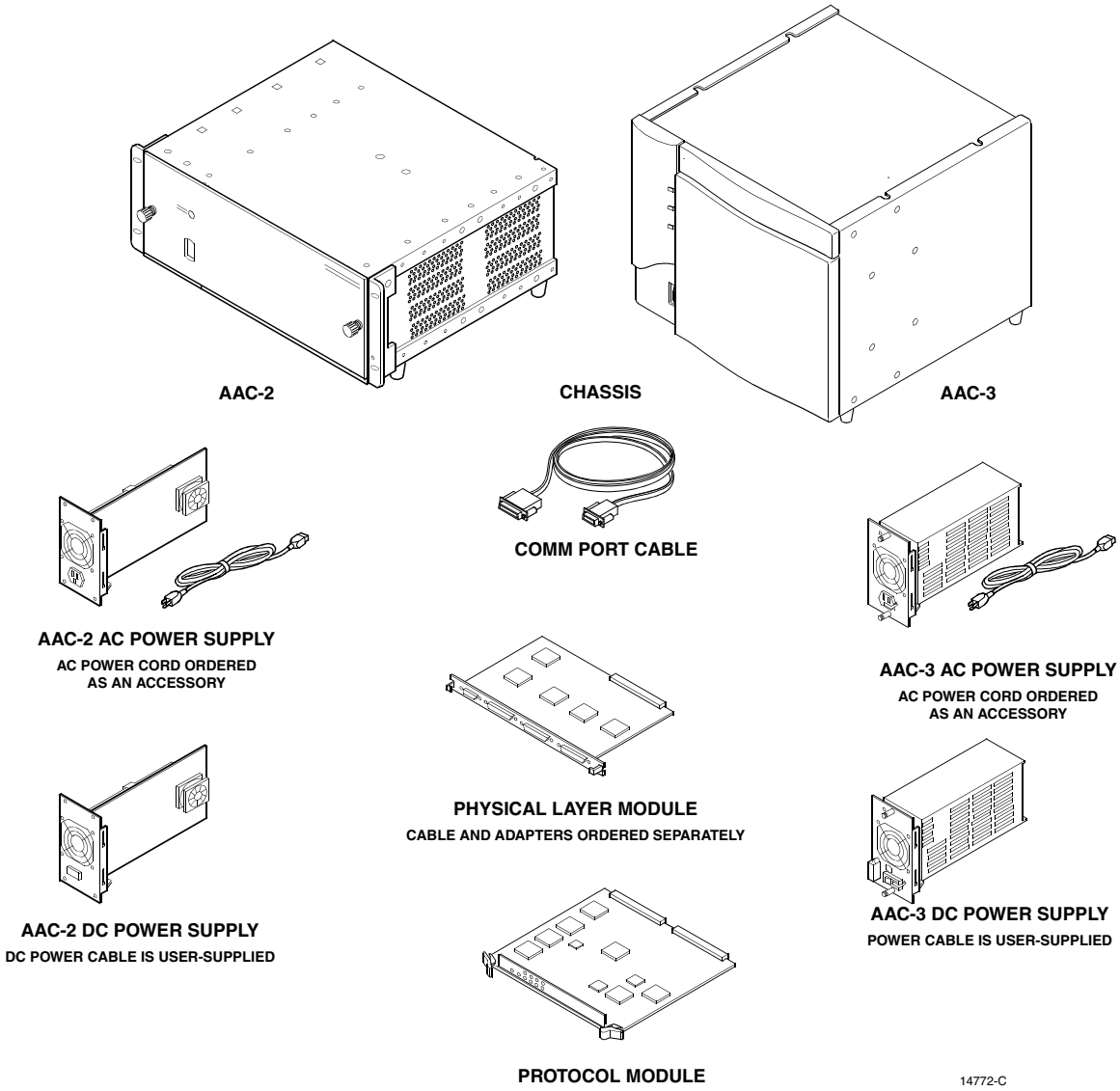


Figure 3: AAC components

1.3 INVENTORY THE SHIPMENT

Compare the shipment against the invoice. The ISC, PLMs and power supplies installed in the chassis can be viewed in the rear panel. To view the Alarm module and installed PMs, remove the chassis front cover.

1.3.1 Remove the Chassis Front Cover

To verify the entire shipment, remove the chassis front cover. See Figure 4.

To remove the cover:

AAC-2

1. Using a #1 Phillips screwdriver, turn the two screws counterclockwise until they are released from the chassis.
2. Lift the cover off the chassis.

AAC-3

3. Place your fingers in the latch indentations on the bottom left and right corners of the chassis cover.
4. Press up on these indentations to release the cover latches, then pull the bottom of the cover away from the chassis.
5. Pull the cover down and off the chassis.

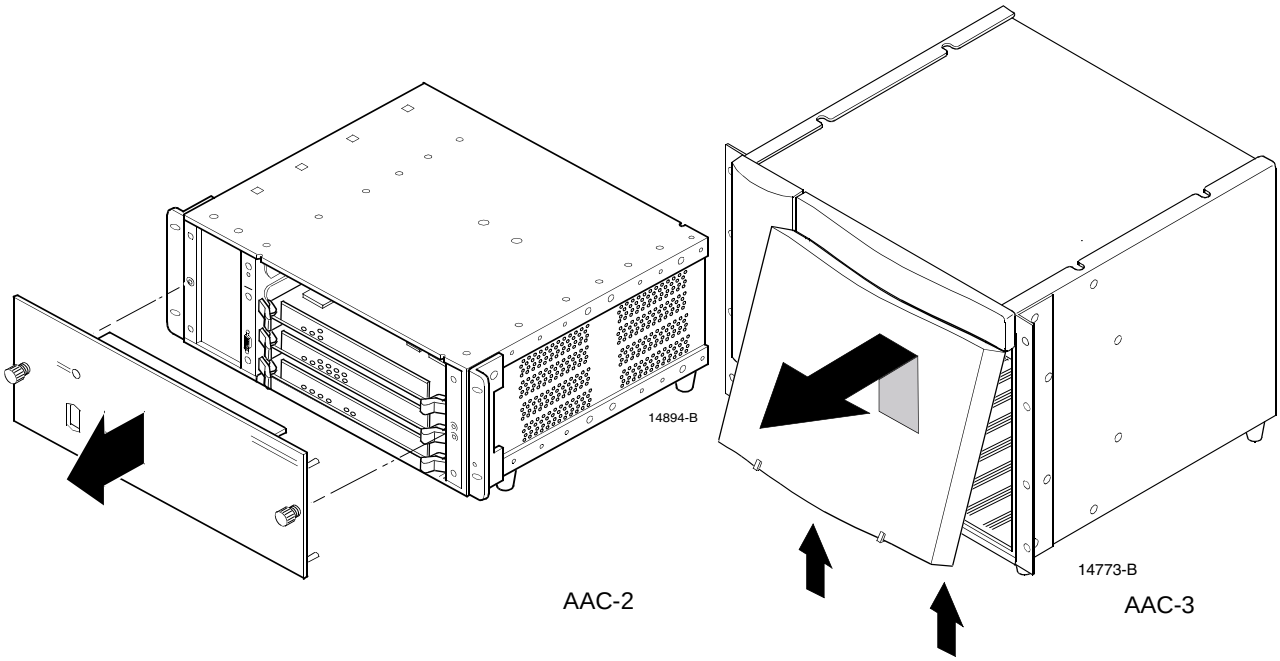


Figure 4: Remove chassis front cover

Caution: *Internal chassis components are susceptible to ESD. Use appropriate precautions when removing the chassis cover.*

⚠ **Warning:** *Voltages greater than 240 VAC may be present on the internal chassis midplane if two power supplies are installed. To avoid personal injury adhere to the safety precautions listed at the front of this manual when accessing the internal components of the chassis. Only qualified service personnel should remove the chassis cover.*

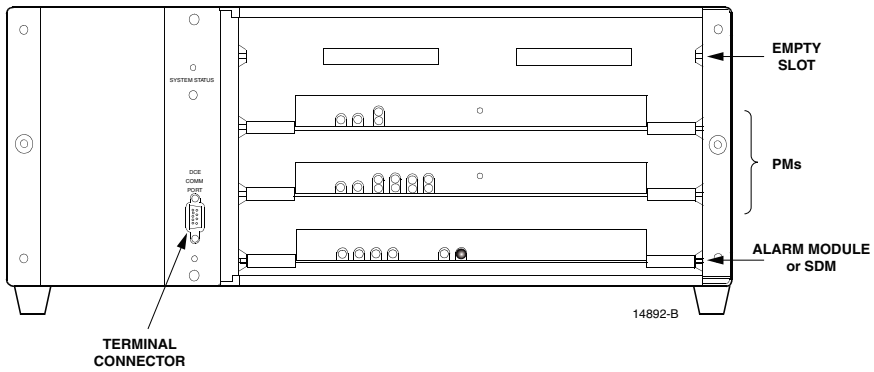
⚠ **Warning:** *Do not leave the front cover off during normal operation of the chassis. Adherence to EMI, ESD protection, thermal cooling, and safety standards require that the front cover and blank panels for unequipped PLM slots be in place.*

1.3.2 Protocol Modules

With the chassis front cover removed, verify that the ordered PMs are installed. Figure 5 on page 26 illustrates sample AAC configurations and the location of modules.

Note: Make sure the front modules are fully seated, with the ejector tabs down and latched behind the guides on the chassis.

AAC-2



AAC-3

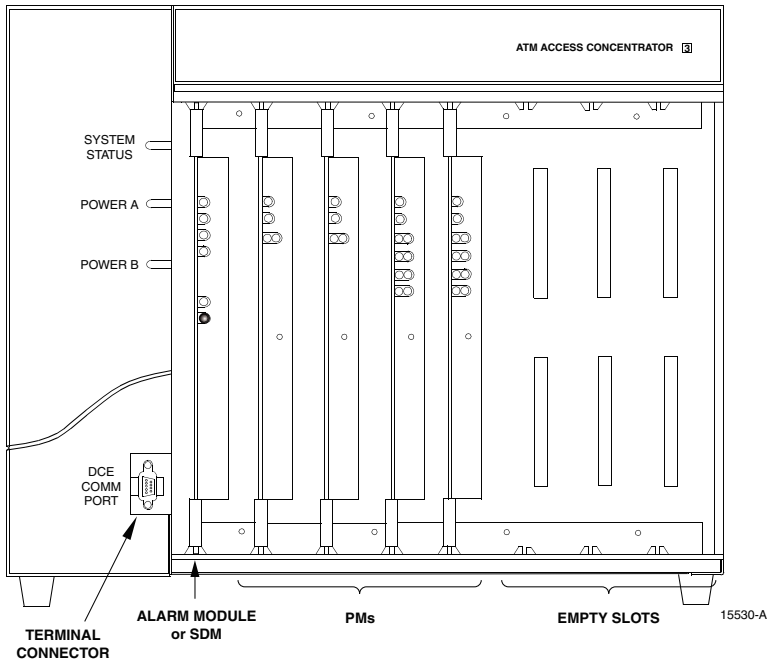
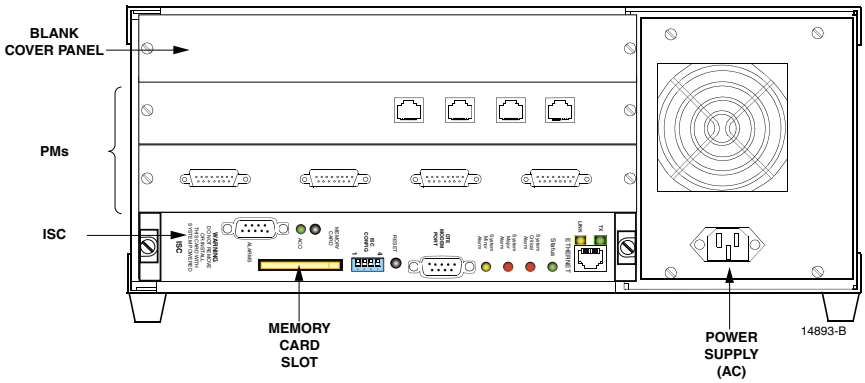


Figure 5: Chassis front

1.3.3 Physical Layer Modules and Power Supplies

The ISC, installed PLMs, and power supplies are visible from the rear of the chassis. Figure 6 illustrates sample configurations.

AAC-2



AAC-3

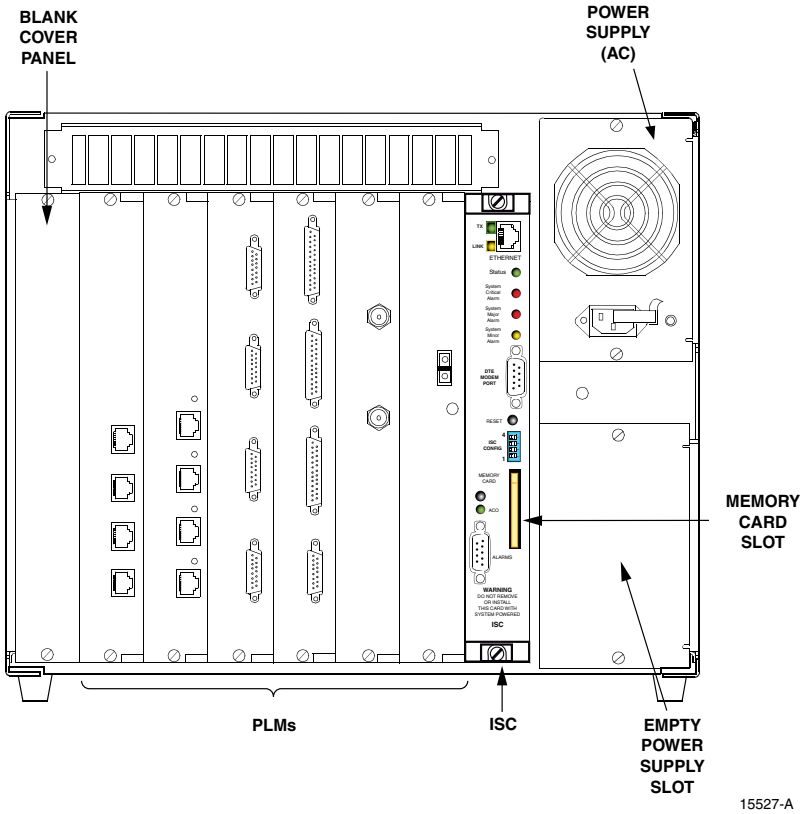


Figure 6: Chassis rear

⚠ **Caution:** *Blank cover panels must be installed during normal operation of the chassis. Adherence to EMI, ESD protection, safety standards, and thermal cooling standards requires that these panels be installed.*

1.3.4 Replacing the Front Cover

Once the shipment has been verified, replace the front cover. See Figure 7 on page 28.

AAC-2

1. Align the front cover with the front of the chassis.
2. Using a #1 Phillips screwdriver, insert the screws by pushing them in and turning them clockwise until tightened.

AAC-3

1. Insert the guides on the top edge of the cover into the matching slots in the bottom edge of the chassis top panel.
2. Once the guides are inserted, push the bottom of the cover onto the chassis until the cover latches snap into place.

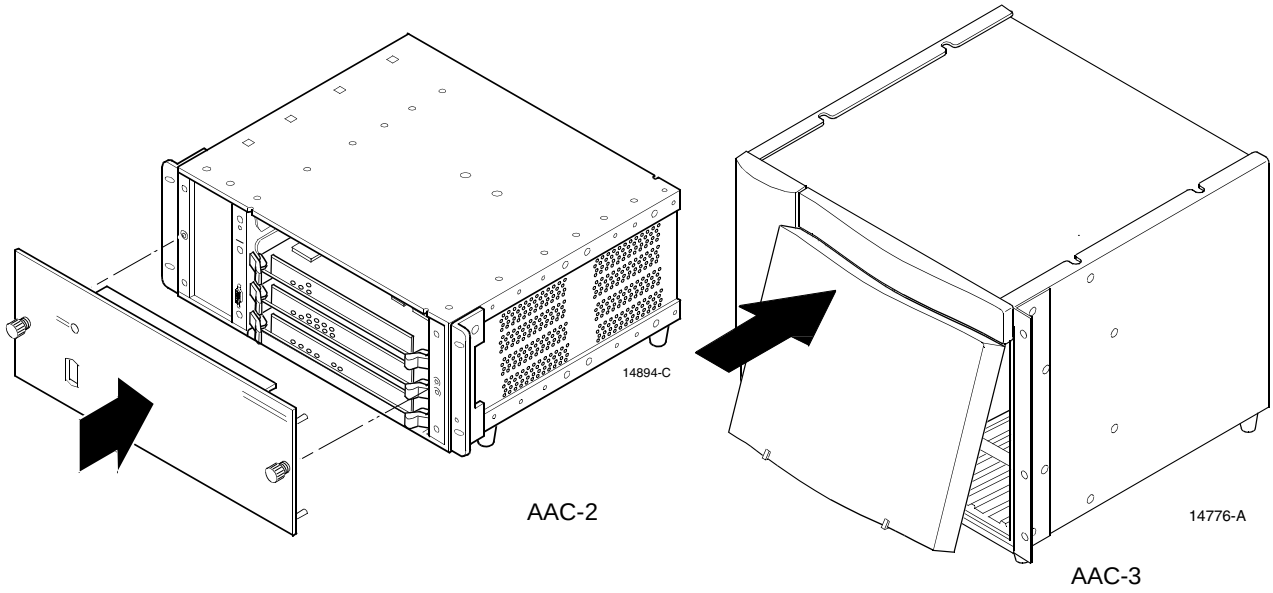


Figure 7: Replacing the front cover

CHAPTER 2: INITIAL INSTALLATION AND POWER UP

This section describes the initial installation of the AAC. It assumes that all modules and power supplies are already in the chassis. If not, refer to Chapter 4 for information about installing components.

Topics included here:

- Installing the chassis on a desktop or in a standard equipment rack
- Connecting a terminal to the front-panel communication (COMM) port
- Powering up the AAC
- Verifying a successful power-up using the self-test diagnostics and LEDs

After reading this chapter, connect the interface cables as described in Chapter 3.

2.1 INSTALL THE CHASSIS

The chassis can installed as a stand-alone unit on a desktop or can mounted in a standard equipment rack.

2.1.1 Clearance Requirements

The AAC-2 chassis has fan exhaust vents in the left side and rear panels and an air intake vent in the right side panel. Clearances of 0.50 in. (12.7 mm) to the left and right side panels and 3 in. (76.2 mm) to the rear of the chassis are required for air flow and cooling. See Figure 8.

The AAC-3 chassis has vents in its left side panel and fans in the to and in each power supply. Clearances of 0.10 in. (2.5 mm) to the left and 3 in. (76.2 mm) to the rear of the chassis are required for air flow and cooling. See Figure 9.

If either chassis is mounted on a desktop, the chassis feet provide enough clearance on the bottom. If the chassis is installed in an equipment rack, a minimum of one rack unit (RU-1.75 in. or 44.5 mm) space must be open below the chassis.

2.1.2 Mounting the AAC on a Desktop

The AAC can stand alone on a flat surface, as long as the clearance requirements specified above are met. Appropriate clearance for the bottom of the chassis is supplied by the rubber feet. Do not remove the feet.

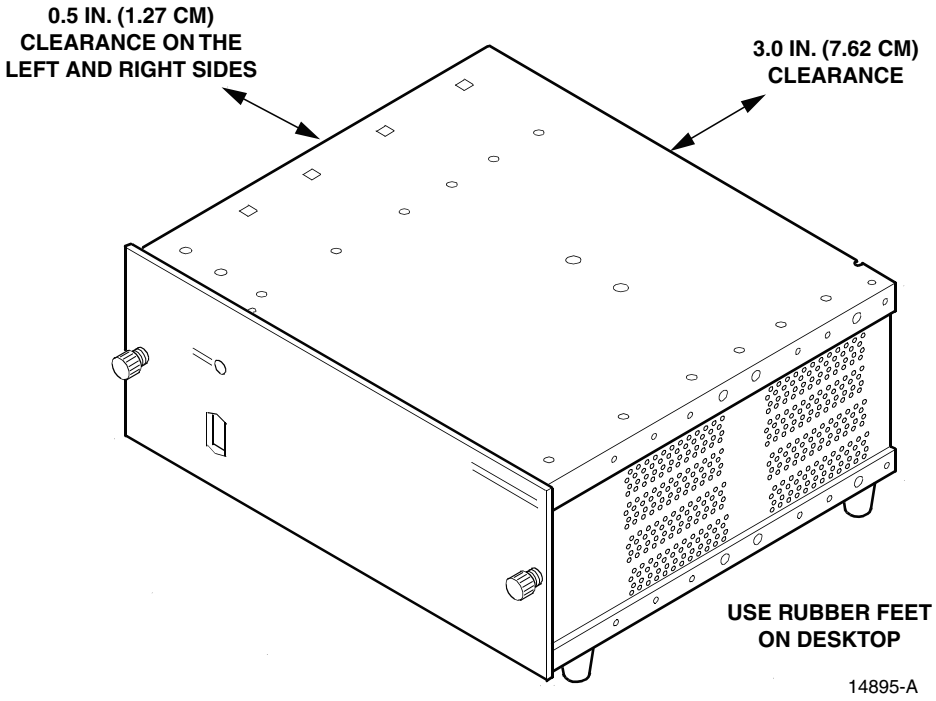


Figure 8: AAC-2 Chassis Dimensions and Clearance Requirements

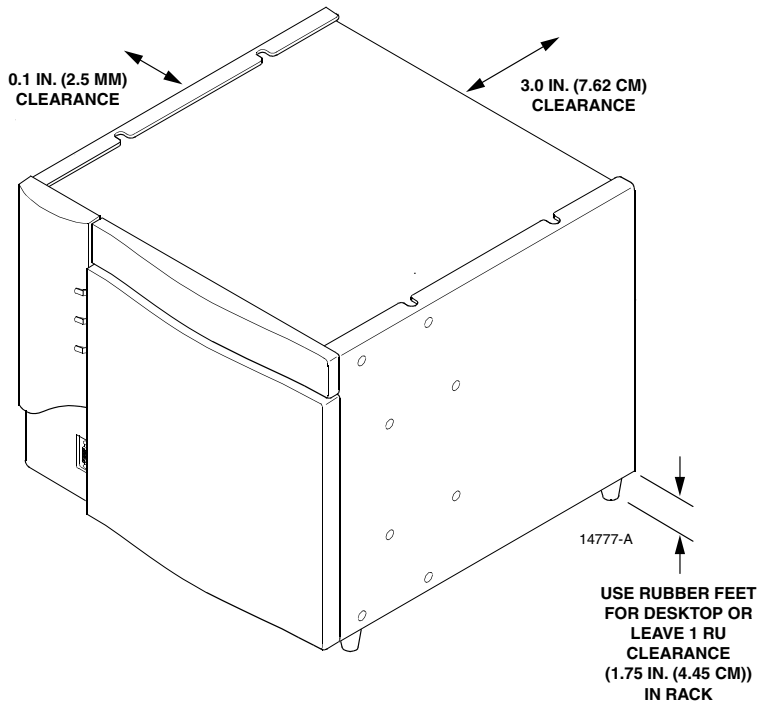


Figure 9: AAC-3 Chassis Dimensions and Clearance Requirements

2.1.3 Mounting the AAC in a Rack

The AAC can be mounted in a standard equipment rack. Mounting ears for a 19 in. rack are provided and are mounted on the chassis. An optional extension plate for mounting the chassis in a 23 in. rack is available.

The AAC-2 takes up a total rack space of 4 rack units (RUs); the AAC-3 takes up a total rack space of eight Rack Units. An additional RU is required below each chassis for cooling. Clearance requirements for the left and rear of the chassis must also be met.

There is no clearance requirement for the top of the chassis.

Figure 10 shows how to mount the AAC in a 19 in. rack. The mounting ears are already installed; if not, install them using the four screws provided with the ears as shown. Use a #2 Phillips screwdriver.

Figure 11 shows how to mount the AAC in a 23 in. rack. Install the optional extension plate on the left side of the chassis (looking at the chassis from the front) to ensure air flow through the chassis left-side vents. Use the four screws provided to secure it to the chassis rack ear. Use a #2 Phillips screwdriver. The extension plate catalog numbers are:

- 10081001 (AAC-3)
- 10081010 (AAC-2)

⚠ **Warning:** *A fully loaded AAC-2 chassis weighs approximately 27 lbs. (12.25 kg); a fully-loaded AAC-3 chassis weighs approximately 60 lbs. (27 kg). This may require two people to lift. Use care when lifting either into a rack. Guide pins are recommended for securing the chassis in position before bolting it to the rack.*

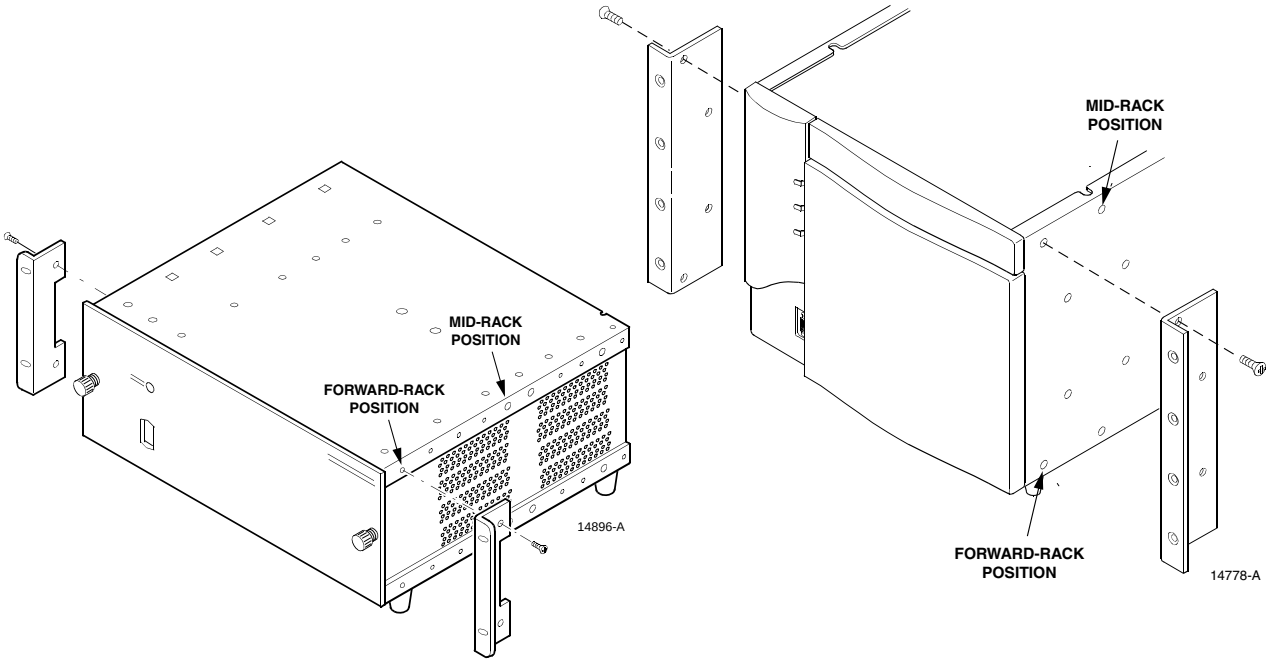


Figure 10: Mounting in a 19-inch rack

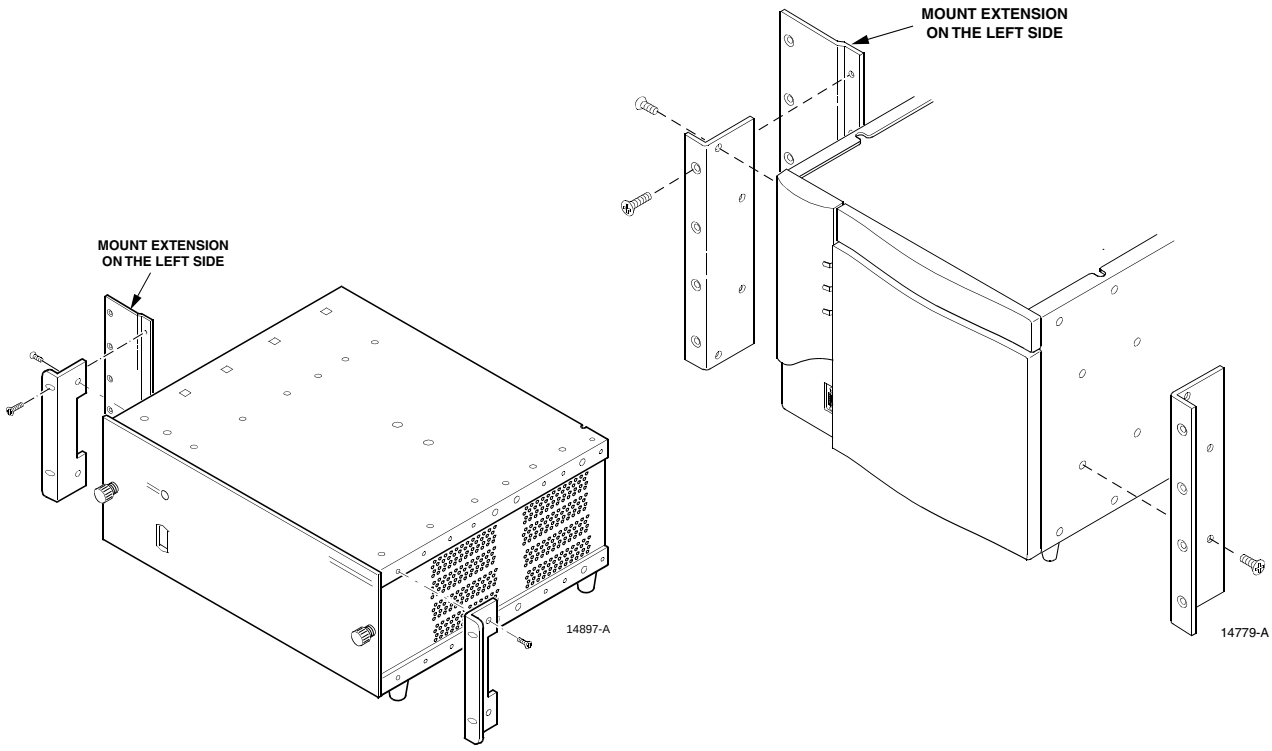


Figure 11: Mounting in a 23-inch rack

2.1.4 Installing AAC-3 Retainer Brackets for Earthquake Safety

In order to meet the Network Equipment-Building System (NEBS) requirements for equipment that is installed in an Earthquake Risk Zone 4, as described in Bellcore Generic Requirements document GR-CORE Issue 1, October 1995, the AAC-3 front panel must be secured so as to eliminate the possibility of it falling during a severe earthquake.

Use one of the two retainer brackets in the kit to bring the AAC-3 into compliance with this requirement. See Figure 12.

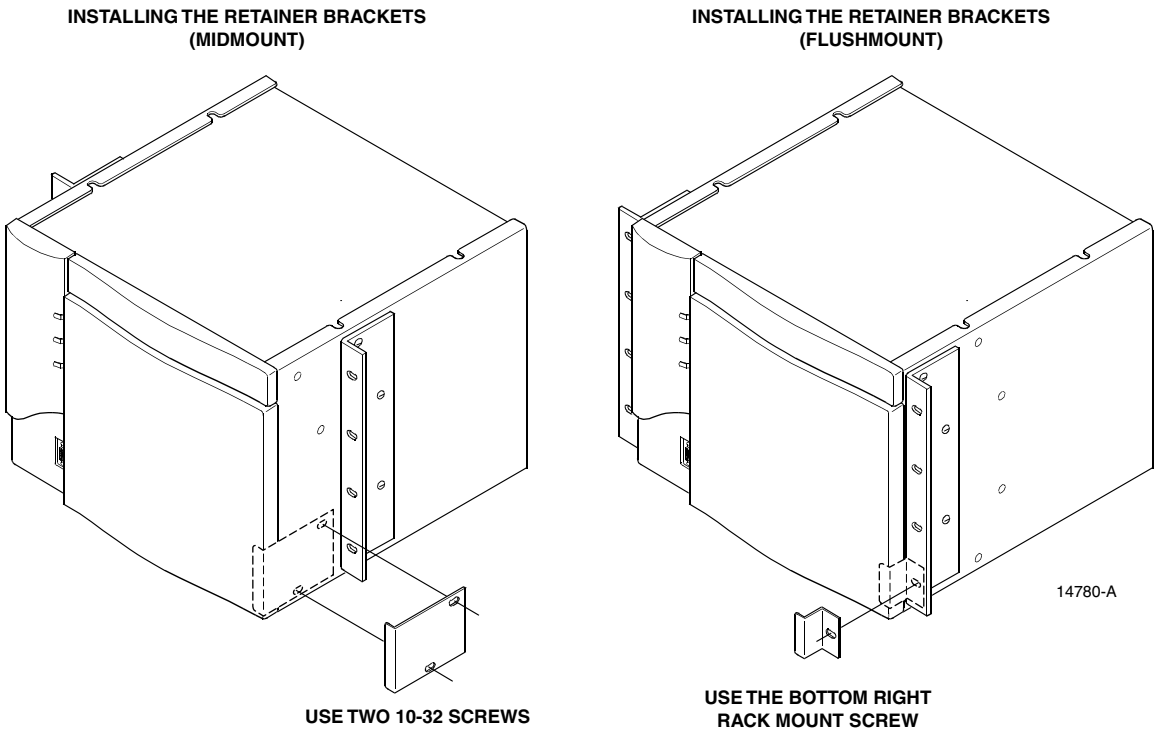


Figure 12: Retainer brackets

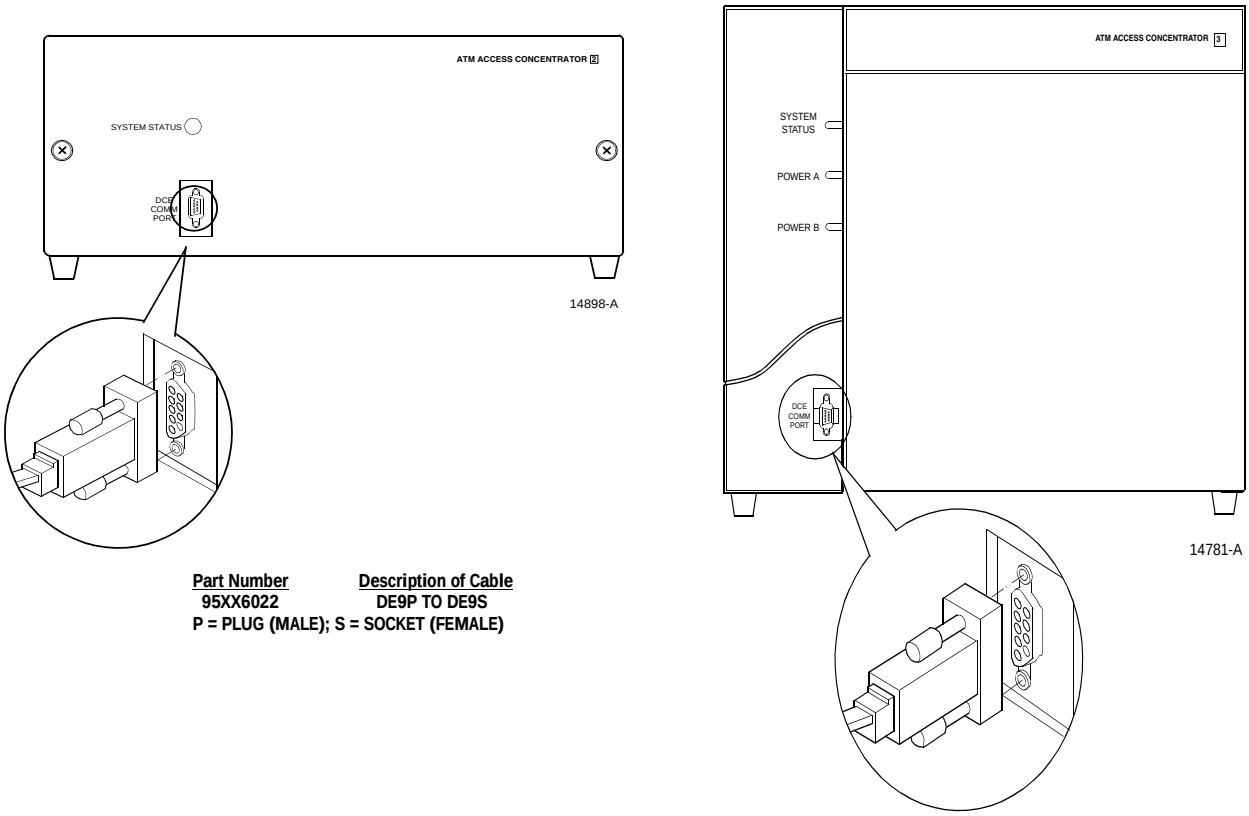
2.2 CONNECT A TERMINAL TO THE DCE COMM PORT

Before powering up the AAC, a terminal should be connected to the DCE COMM port so that the AAC self-test diagnostics can be viewed during power-up. The serial cable for the COMM port is a standard PC 9-pin cable. This cable is available as an optional accessory. See Figure 13.

VT100 and compatible terminals are supported.

The terminal's option settings may need to be modified to be compatible with the AAC. If VT220/VT320/VT420 terminals are emulating VT100, use the PF2 key instead of the F2 key to pop up choice lists. The Function and Shift-Tab keys may also need to be re-mapped. See Appendix C for a detailed list of requirements.

For the connector pinout see Appendix A, Table 1.



Part Number	Description of Cable
95XX6022	DE9P TO DE9S

P = PLUG (MALE); S = SOCKET (FEMALE)

Figure 13: Connecting a terminal to the COMM port

2.3 COMM PORT SETTINGS

The DCE COMM port on the chassis front panel adjusts settings automatically (autobaud) to match the connected terminal. Press Enter several times to allow the port to adapt to the connected terminal and display the initial prompt.

2.4 POWER UP THE CHASSIS

Power up the chassis by connecting the power cord to an appropriate power source. If the chassis is an AAC-3 with two power supplies, connect both supplies to the power source. The power supplies are redundant and either can power the entire chassis.

⚠ **Warning:** *To avoid hazardous voltages never connect a power cord to a power supply that is not installed in the chassis. Always disconnect the power cord before installing or removing a power supply.*

2.4.1 Connecting to an AC Power Source

Connect an installed AC power supply to a grounded power receptacle with the appropriate voltage. The power requirements are specified on the rear panel of the power supply. See Figure 14.

1. (AAC-3 only) Lift the interlock guard located over the input connector of the AC power supply. If the guard cannot be easily lifted, the power supply module may not be fully inserted into the chassis. Loosen the two screws on the supply, push the supply module into the slot until it is completely seated, then retighten the screws. The guard should now lift easily.
2. Plug the power cord into the input connector.
3. Plug the other end of the cord into the power source receptacle.

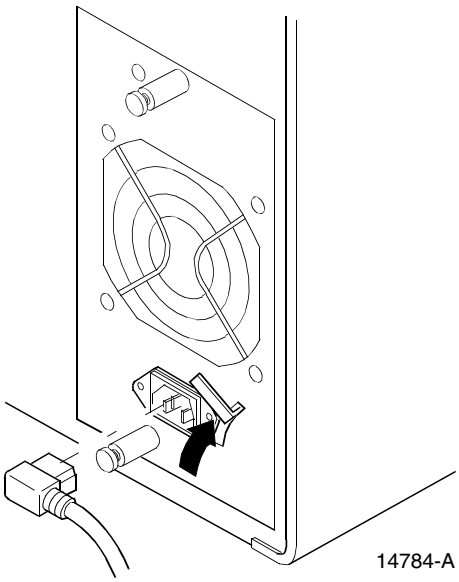


Figure 14: Connecting an AC power cord

2.4.2 Connecting to a DC Power Source

Connect the DC power supply to a power source capable of supplying the appropriate voltage and current. The requirements are specified on the rear panel of the supply. See Figure 15 and Figure 16.

To connect the supply.

1. Make sure the DC supply is fully seated in the chassis. On the AAC-3 only, ensure that the on/off switch is set to the off (O) position. Access the power supply on/off switch by lifting the interlock lever.
2. Turn off the DC power source or disconnect the power cable from the source before connecting the cable to the power supply.
3. Open the plastic terminal strip cover by lifting it from the unhinged side. Pivot the cover to to the fully open position to access the terminal strip. Use caution when opening the cover to prevent damaging the cover. Snap the cover back in place after connecting power.
   CAUTION: The cover is designed to be opened by hand, and may break if a screwdriver or similar tool is used to pry it open.
4. Prepare one 14 AWG (1.63 mm) or larger wire with green insulation and one or more yellow stripes to connect to frame ground (earth). Connect frame ground to the ground terminal. Strip 0.125 in. (3.2 mm) off the insulation from the plug end. Do not strip more than 0.25 in. (6.4 mm).

5. Prepare two 14 to 18 AWG (1.63 to 1.02 mm) wires for the DC power termination. Connect the positive source to the right (AAC-2) or top (AAC-3) terminal and the negative source to the middle terminal. Strip 0.125 in. (3.2 mm), but not more than 0.25 in. (6.4 mm), off the insulation from the plug end of each wire.

   Attach the wires to the termination plug using a #2 Phillips screwdriver.

6. When the wiring is complete, attach the other end of the power cable to the DC power source.
7. Apply power to the DC power source (-48 VDC, nominal).
8. Finally, turn on the power supply (AAC-3 only). Lift the interlock guard and push the on/off switch to the on (I) position.
9. When the on/off switch is in the on position, loosen the power-switch latch using a flat-blade screwdriver, swing the latch over the switch, and tighten the screw (AAC-3 only).

Note: If the DC power source is below the acceptable voltage threshold or if the power source is slow to rise to an acceptable level, the power supply may not power up properly when the AAC DC power supply is turned on. Turn the power supply off and on once the power source is at an acceptable voltage threshold.

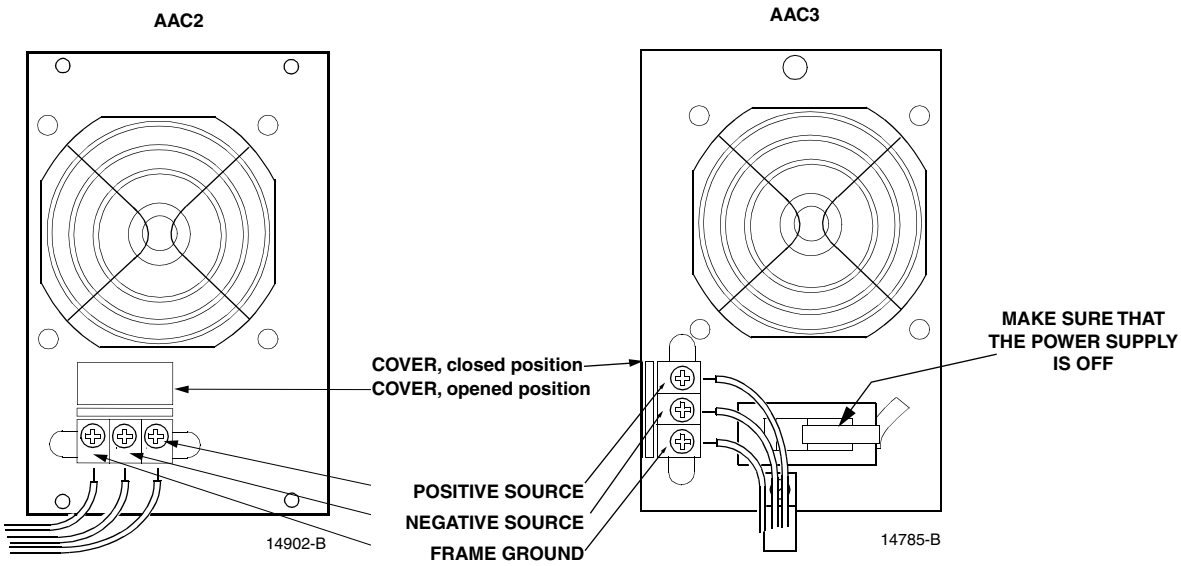


Figure 15: Connecting the DC power source

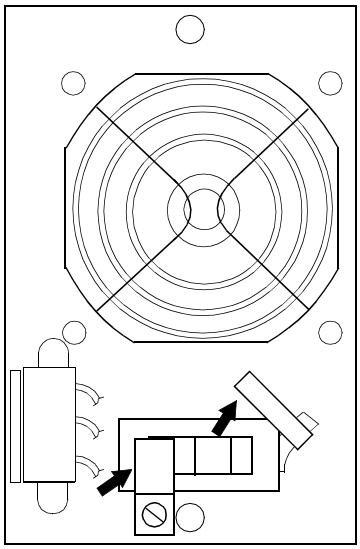


Figure 16: Turning on the AAC DC power supply

2.5 SELF-TEST DIAGNOSTICS

When the AAC powers up, it runs through a series of self-test diagnostics and then displays a "Welcome" login message on the terminal. If the login message appears, the self-test has completed successfully and login can be performed as described on page 41. If the login message does not appear, the AAC may have encountered a power-up or software initialization error, or the terminal may not be connected properly.

2.5.1 A Successful Power Up

The final indication that the AAC passed its diagnostics is the login message on the terminal. The DCE COMM port adjusts settings automatically (autobaud) to match the connected terminal. Press Enter several times to allow the port to adapt to the connected terminal and display the login message. Instructions for logging in appear on page 41.

```
--- AAC-3 ---
Unauthorized access and use of this device is prohibited.


Please enter your userID:
```

Figure 17: Login prompt

2.5.2 Standard LED Behavior During a Successful Power-Up

Other indicators of a successful power up are the front-panel LEDs. See Figure 18.

The AAC-3's power LEDs should be green for installed power supplies and off for empty power supply slots. Power A refers to the upper power supply and Power B refers to the lower power supply. At least one power LED must be green. There are no power LEDs on the AAC-2.

The System Status LED of both AAC models may be red or green, but should not be off. If the LED is off, the AAC encountered a power, self-test, or initialization error. The red/green state of the System Status LED is useful as an indicator of system health once all of the system ports have been connected and appropriately configured. At this stage of the installation process, a red System Status is acceptable (See the *AAC User's Guide* for a complete description of the LEDs and their meanings during normal operation.).

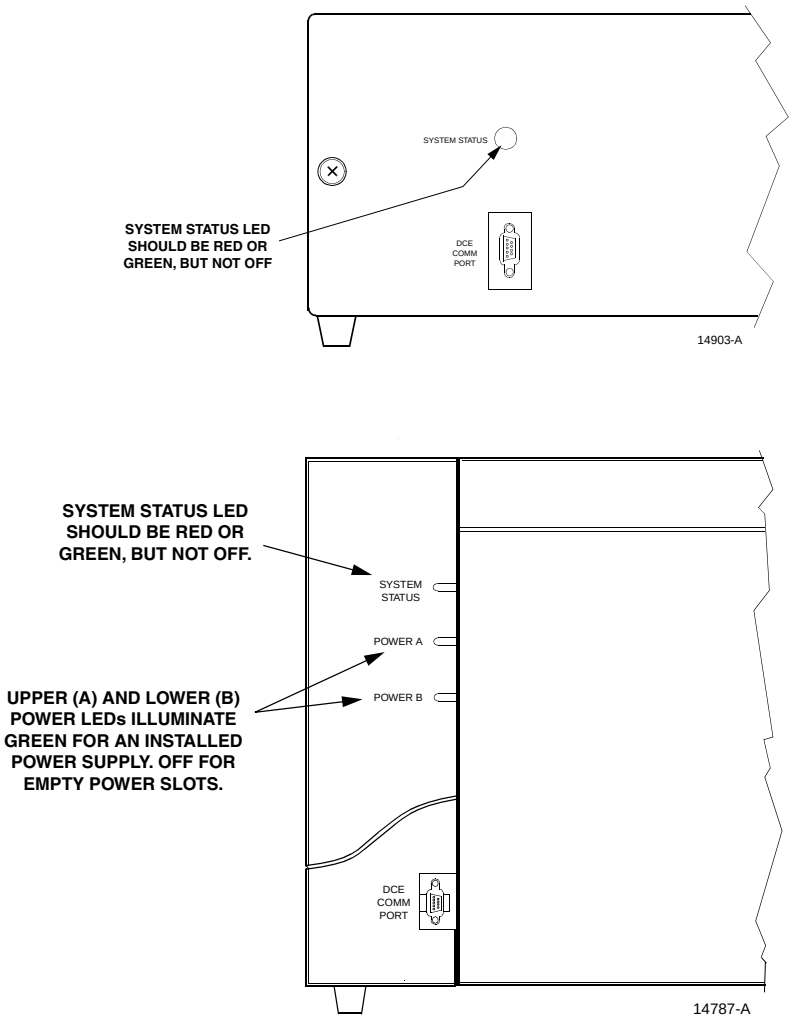


Figure 18: System Status and Power LEDs

2.5.3 An Unsuccessful Power-Up

The power-up is not successful if the AAC login message does not appear on the terminal. Under these circumstances, the AAC has most likely encountered a self-test or software initialization error, or the terminal may not be connected properly. Start troubleshooting as follows:

1. Verify that at least one power LED is green. If all power LEDs are off, the chassis is not receiving required power. See Figure 18.
2. Verify that the terminal is connected and powered properly.
3. If using a VT100 terminal or VT100 emulator, make sure the terminal options are set correctly. See Appendix C.
4. Once the terminal is connected and configured properly, press the Enter key. A prompt requesting the user ID should appear. If it does not appear, call for technical assistance as directed on page 7.

2.6 LOG INTO THE SYSTEM

You can access the user interface through a terminal connected to the DCE COMM port, through the DTE modem port, or through Telnet over an Ethernet or in-band connection. The DCE COMM port automatically adapts to the baud rate of your terminal.

Log in by entering a user ID, password, and terminal type.

When the self-test diagnostics complete successfully, the screen may display a sequence of initialization messages that end in the login display. If you do not see the login display after a moment, press ENTER. When connecting through the DCE COMM port, press ENTER several times to allow the AAC to adjust its baud rate to your terminal.

```
--- AAC-3 ---
Unauthorized access and use of this device is prohibited.


Please enter your userID: su
Please enter your password:
```

Figure 19: Login prompt

To log in, a user ID and password must be entered. The default user IDs and passwords are:

su Use this user ID to log in as a super user, which means that configuration parameters, passwords, and SNMP community strings can be accessed and modified. The default password for this user is also “su”.

rw Use this user ID to log in with read/write privileges. Any configuration parameter except passwords and SNMP community strings can be accessed and modified. The default password for this user is also “rw”.

ro This user ID has read-only privileges. The default password for this user is also “ro”.

Log in with the **su** user ID to perform the procedures described in this manual. After you enter the password, you are prompted to make a terminal type selection. Enter a type that matches the terminal.

```
--- AAC-3 ---
Unauthorized access and use of this device is prohibited.


Please enter your userID: su
Please enter your password:

SU access granted

Your system default terminal type is 'vt100'
Enter the number for your terminal type

IMPORTANT - choose correctly !!

    <0> [ default ]
    <1> vt100, or Hyperterminal
    <2> Sun shelltool (OpenWindows)

    <Q> [ Quit ]
```

Figure 20: Terminal selection at login

- Select terminal choice 1 when the terminal is a true VT100 or supports true VT100 emulation. This option supports the function keys PF1 - PF4, which correspond to F1 - F4 on other terminal keyboards. When using this terminal choice, make sure that the terminal options and key mappings are set up correctly for the AAC. See Appendix C for details.
- If terminal choice 2 is selected, the shell tool window must be sized to be at least 80 columns x 24 lines and scrolling must be OFF. Do not use a `cmdtool` window.

The default terminal choice is VT100.

Note: If a terminal choice is not entered within 30 seconds the AAC times out automatically and the log in must be started again.

If the appropriate terminal type is selected and the terminal is configured correctly, the System Configuration form is displayed. If a terminal type that does not match the connected terminal is selected, or if the terminal is configured incorrectly, the display may show meaningless characters, or the keyboard may not operate as expected. Press the Esc key twice to return to the preceding form and select the correct terminal type.

2.6.1 Logging Out

Log out from the System Configuration form by tabbing to the [Logout] button and pressing Enter. See Figure 21.

After a session has been idle (no keystrokes) for 30 minutes, the session is logged out automatically.

2.7 VERIFY THE INSTALLATION

The top of the System Configuration form (see Figure 21) provides information about the system, including the software revision. The system name, location, and date are undefined until system configuration is complete. The power supply alarm fields display “UNKNOWN” until they have been configured.

The bottom of the System Configuration form displays the modules installed in the chassis. The System Configuration form displayed for an AAC-2 is the same except only four slots appear instead of eight.

Power supplies remain “UNKNOWN” until they have been configured as described in the Users Guide.

This part of the form lists installed modules; verify that this list includes all of the modules in the chassis.

```
+---------------------------- System Configuration -----------------------------+
|                                                                  [ Events... ]  |
|  System Name:            No system name set.                                   |
|  System Location:        No system location set.                               |
|  System Date:            11-Jul-2001 12:44:06                                  |
|  Software Version:       3.0.0(09) 2001-6-28,13:56:57.0                        |
|  System Clock Source:    1:1 Internal                    [ Primary ]           |
|  Memory Card Slot:       Empty                                                 |
|  Power Supplies: (Upper) UNKNOWN   (Lower) UNKNOWN   Fan(s): OK                |
|                                                                                |
|  [ System Admin... ]      [ SNMP & TCP/IP... ]      [ Utilities... ]           |
|  [ Connections...  ]                                [ Logout ]                 |
|                                                                                |
|  Slot 1 F [Empty]                      ( ) R ISC                               |
|  Slot 2 F Quad Cell PM                 ( ) R Quad DSX-1 PLM                    |
|  Slot 3 F Empty                        ( ) R                                   |
|  Slot 4 F Quad Packet/CBR PM           ( ) R Quad V.35/530 PLM                 |
|  Slot 5 F Cell PM                      ( ) R DS3 PLM                           |
|  Slot 6 F Cell PM                      ( ) R OC3c/STM1 MM PLM                  |
|  Slot 7 F Empty                        ( ) R                                   |
|  Slot 8 F Empty                        ( ) R                                   |
|                                                                                |
+--------------------------------------------------------------------------------+
 System Administration Functions
```

Figure 21: System Configuration form

If the bottom of the System Configuration form is an accurate reflection of the modules in the chassis, and there are no error messages, connect the cables and configure the ports as described in Chapter 3.

If there is a module installed that does not appear on this screen, or if an error message appears in place of the module name, the module may be faulty. Do the following:

1. Verify that the module is installed correctly and fully seated in its chassis slot.
2. Make sure that the Protocol Module (PM) and the Physical Layer Modules (PLM) are paired appropriately. If not, a "PM/PLM mismatch" message may be displayed in the System Configuration form. See Appendix B for a listing of compatible modules.
3. A "config mismatch" message may be displayed if a new module is installed in a slot previously configured for a different module.
4. A "failed PM/PLM" may be reported for the module pair if either is faulty, however a faulty module may not be displayed on the System Configuration form. In either case, contact our Customer Support service.
5. View the Event History Report for more information on any faults that are detected.

Note: Initially, you can ignore the Status and In/Out LEDs on the PMs. Many of them may be off if the System Controller has an error, or they may be red because the port is not yet configured.

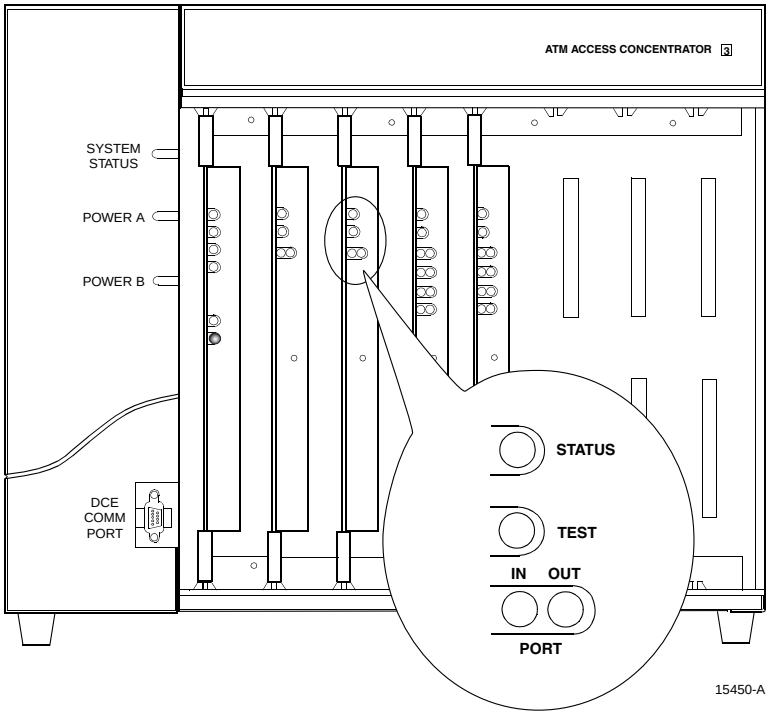


Figure 22: PM status and In/Out LEDs

2.7.1 Reset the System If Necessary

If the system needs to be reset, this can be accomplished without affecting the configuration options. Accomplish this by pressing the Reset button (see Figure 23). This action restarts the system using the current configuration settings. Press and hold the Reset button until the ISC LEDs begin the power-up cycle. The system fully resets in one or two minutes.

A reset logs out all users.

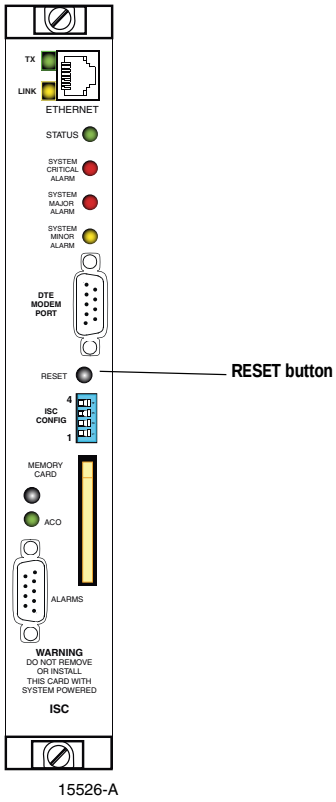


Figure 23: ISC Reset Button Location

CHAPTER 3: CONNECTING CABLES

This chapter describes the cabling requirements for the various ports. This includes network ports, data ports, and the Ethernet and modem ports located on the Integrated System Controller (ISC) module that can be used for remote access. The only port connection not described in this section is the front-panel COMM port. See Connect a Terminal to the DCE COMM port in Chapter 2 for information on how to connect to the COMM port.

See Appendix A for connector pinouts.

3.1 DTE MODEM PORT CABLING

The DTE Modem port on the ISC is used for an external modem connection. See Appendix A for DTE Modem port connector pinouts.

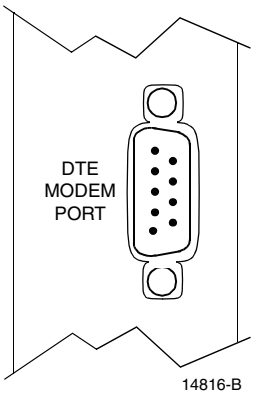


Table 1. DTE Modem Port Cables and Adapters

PART NUMBER	DESCRIPTION
95xxx023	DE9S to DB25P straight cable
10089	DE9P (male) to DE9P (male) crossover adapter
xxx is the cable's length in feet. Contact Kentrox for available lengths.	

1. Connect the adapter to the DTE Modem Port on the ISC.
2. Connect the cable to the adapter. Secure the cable to the panel with the screws built into the cable.
3. Connect the other end of the cable to a modem.

3.2 ETHERNET CABLING

A Telnet session can be established with the AAC over an Ethernet LAN connection to the ISC. See Appendix A for Ethernet connector pinouts.

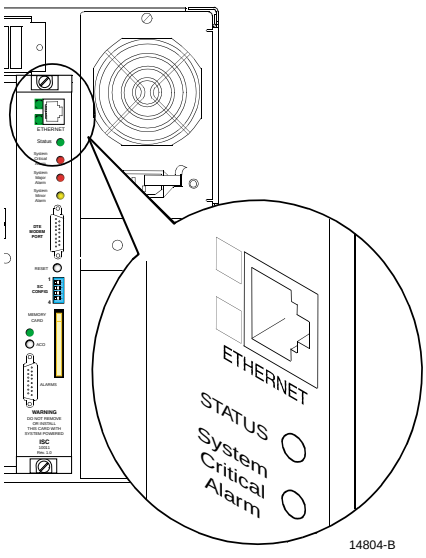


Figure 24: ISC Ethernet Port

Table 2. Ethernet Cables and Adapters

PART NUMBER	DESCRIPTION
950xx077	RJ45 to RJ45 Cat 3. Unshielded Twisted Pair (straight 10Base-T cable when connecting to a hub)
950xx078	RJ45 to RJ45 Cat 3. Unshielded Twisted Pair (cross-over 10Base-T cable when connecting to an Ethernet station)
xx is the cable's length in feet. Contact Kentrox for available lengths.	

1. Connect the cable to the Ethernet port on the ISC. Make sure that the retainer snaps firmly into place. If the cable becomes loose, the network connection will be lost. To secure the connection, wire-tie the Ethernet cable to the ISC.

2. Connect the other end of the cable to an Ethernet hub (or to an Ethernet station using a cross-over cable). Make sure the Link Integrity LED is ON.

3.2.1 Maximum Cable Length

The maximum cable length is 328 ft. (100 m) from transmitter to receiver.

3.3 OC-3C/STM1 SINGLE-MODE CABLING

This port receives and transmits an optical serial data stream over two point-to-point single-mode core fiber.

Warning: *This is a class 1 LASER source. Avoid eye exposure to LASER beams at the port connector or cable ends.*

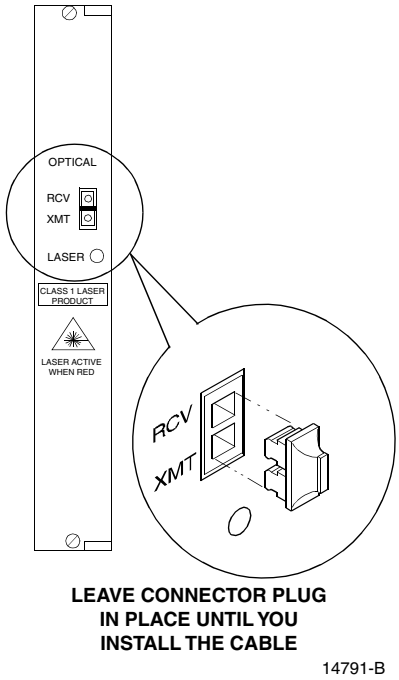


Table 3. OC-3c/STM1 Single-mode Cables and Adapters

PART NUMBER	DESCRIPTION OF CABLES
FDC-SPSC-1-xxF	SC connector on a single-mode fiber with xx being the length in feet
FDC-SPSC-1-xxF	SC connector on a single-mode fiber with xx being the length in meters
Contact Kentrox for available lengths.	

1. Remove the plug from the connector sockets.

2. Remove the plugs from one end of the duplex cable and insert the cable connectors into the sockets. Align the guides on the cable connectors with the slots in the sockets.

3. Remove the plugs from the other end of the cable, then connect the cable to the network or terminal equipment. Refer to the appropriate manufacturer or carrier instructions.

Note: A duplex SC fiber connector is used for this connection.

Figure 25: OC-3C/STM1 Single-mode Port

TIP	The LED on this module indicates whether the LASER signal is active (red) or off (green). The LASER signal is off by default. The signal is turned on using a form field.

3.3.1 Maximum Cable Length

The maximum cable length is 15.5 miles (25 kilometers). Note that extra cable splices will reduce the maximum length.

Caution: *The cable allows a minimum bend radius of 1.5 in. (38 mm). Avoid crimping the cable, either by tightly coiling the cable or by using tight cable ties. Excessive crimping will damage the cable.*

3.4 OC-3C/STM1 MULTI-MODE CABLING

This port receives and transmits an optical serial data stream over two point-to-point multi-mode (mm) fiber with core diameters from 50 to 100 microns.

Warning: *Avoid eye exposure to LASER beams at the port connector or cable ends.*

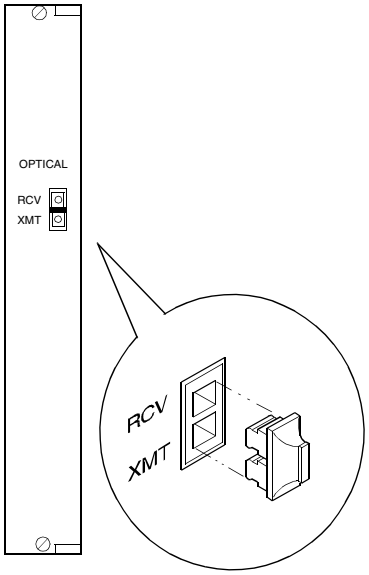


Figure 26: OC-3C/STM1 Multi-mode Port

Table 4. OC-3c/STM1 Multi-mode Cables and Adapters

PART NUMBER	DESCRIPTION OF CABLES
FDC-MSC-A-xxF	SC connector on a multi-mode fiber with xx being the length in feet
FDC-MSC-A-xxM	SC connector on a multi-mode fiber with xx being the length in meters
Contact Kentrox for available cable lengths.	

1. Remove the plug from the connector sockets.

2. Remove the plugs from one end of the duplex cable and insert the cable connectors into the sockets. Align the guides on the cable connectors with the slots in the sockets.

3. Remove the plugs from the other end of the cable, then connect the cable to the network or terminal equipment. Refer to the appropriate manufacturer or carrier instructions

Note: A duplex SC fiber connector is used for this connection.

3.4.1 Maximum Cable Length

The maximum cable length is 1.24 miles (2 kilometers), using a 62.5 µm core fiber with 500 MHz/km bandwidth. Note that extra cable splices will reduce this length. For longer distances, use the OC-3c/STM1 single-mode physical layer module and single-mode fibers.

Caution: *The cable allows a minimum bend radius of 1.5 in. (38 mm). Avoid crimping the cable, either by tightly coiling the cable or by using tight cable ties. Excessive crimping may damage the cable.*

3.5 DS3 CABLING

The DS3 port receives and transmits data over a pair of 75-ohm coaxial cables, with BNC connectors.

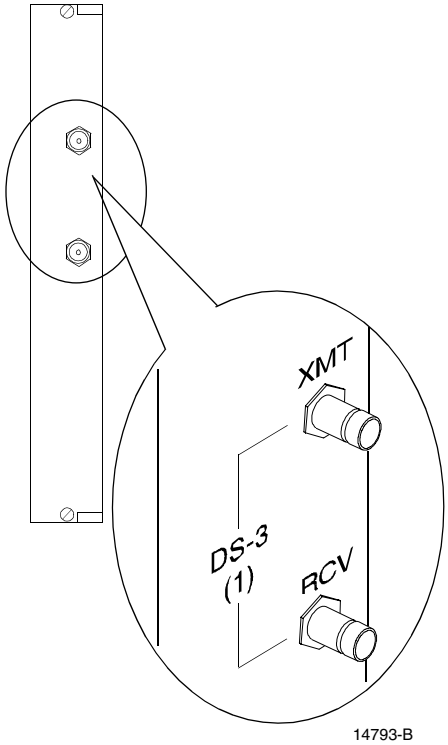


Figure 27: DS3 Port

Table 5. DS3 Cables and Adapters

PART NUMBER	DESCRIPTION OF CABLES
960xx010	BNC Plug (male) to BNC Plug (male)
xx is the cable's length in feet. Contact Kentrox for available lengths.	

1. Connect the far-end receive connector to the DS3 transmit (XMT) output.

2. Connect the far-end transmit connector to the DS3 receive (RCV) input.

3.5.1 Maximum Cable Length

The maximum cable length end-to-end is 900 ft. (274.32 m), 450 ft. (137.16 m) maximum from transmitter to cross-connect and 450 ft. (137.16 m) maximum from cross-connect to receiver.

3.6 E3 CABLING

The E3 port receives and transmits data over a pair of 75-ohm coaxial cables, with BNC connectors.

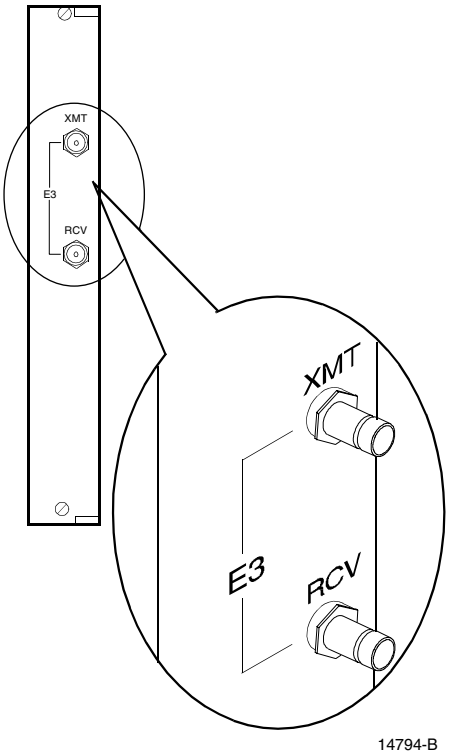


Figure 28: E3 Port

Table 6. E3 Cables and Adapters

PART NUMBER	DESCRIPTION OF CABLES
960xx010	BNC Plug (male) to BNC Plug (male)
77994	BNC Plug (male) to DIN Socket (female) adapter *Not in item master list*
xx is the cable's length in feet. Contact Kentrox for available lengths.	

1. Connect the far-end receive connector to the E3 transmit (XMT) output.

2. Connect the far-end transmit connector to the E3 receive (RCV) input.

Note: To earth-ground the receive (RCV) BNC, unscrew the hex nut using a 14 mm wrench and remove the plastic washer behind the hex nut. Replace the hex nut and tighten a quarter turn past finger tight. The factory default setting is floating using a plastic washer.

3.6.1 Maximum Cable Length

The maximum cable length end-to-end is 900 ft. (274.32 m), 450 ft. (137.16 m) maximum from transmitter to cross-connect and 450 ft. (137.16 m) maximum from cross-connect to receiver.

3.7 J2 CABLING

The J2 port receives and transmits data over a pair of 75-ohm coaxial cables, with BNC connectors.

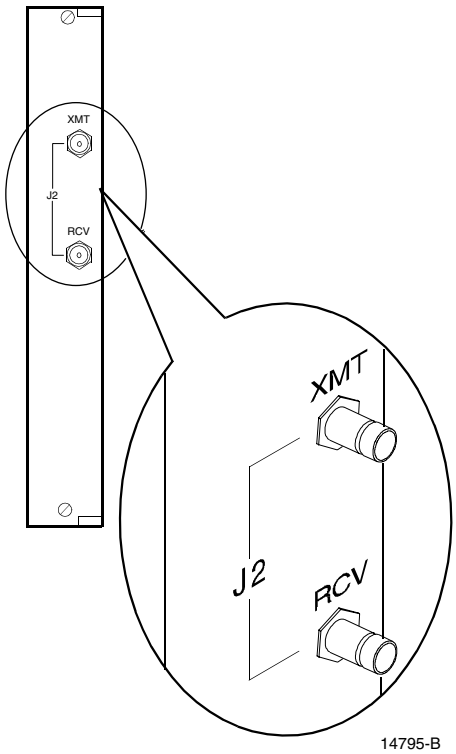


Figure 29: J2 Port

Table 7. J2 Cables and Adapters

PART NUMBER	DESCRIPTION OF CABLES
960xx010	BNC Plug (male) to BNC Plug (male)
xx is the cable's length in feet. Contact Kentrox for available lengths.	

1. Connect the far-end receive connector to the J2 transmit (XMT) output.

2. Connect the far-end transmit connector to the J2 receive (RCV) input.

3.7.1 Maximum Cable Length

Maximum cable length is 984.3 ft. (300 m).

3.8 DSX-1 CABLING

The DSX-1 port receives and transmits data over 100-ohm differential lines, using a 15-pin female connector. See Appendix A for DSX-1, DA15 connector pinouts.

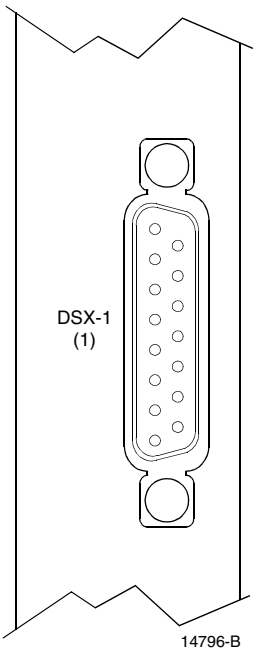


Figure 30: DSX-1 Port

Table 8. DSX-1 Cables and Adapters

PART NUMBER	DESCRIPTION OF CABLES
930xx121	DA15P to RJ48C modular plug
77892	DA15P to RJ48C socket adapter
77993003	DA15P to Barrier Strip adapter
930xx101	DA15P to Stub
930xx091	DA15P to DA15S
930xx131	DA15P to DA15P
P = plug (male); S = socket (female)	
xx is the cable's length in feet. Contact Kentrox for available lengths.	

Note: The DSX-1 is not a network interface. An external Channel Service Unit (CSU) is required to connect this interface to a public network. A cross-over cable is required to connect this port directly to another DSX-1 interface.

1. Connect the cable to the port. Secure the cable connector to the panel with the screws built into the connector.

2. Connect the other end of the cable to the CSU or terminal equipment using the manufacturer or carrier instructions.

3.8.1 Maximum Cable Length

The maximum cable length is 655 ft. (199.6 m) from transmitter to cross-connect.

3.9 E1 CABLING

The E1 port receives and transmits data over 120-ohm differential lines, using a 15-pin, female connector. A 120-ohm to 75-ohm BNC adapter is available for coaxial cabling. See Appendix A for E1, DA15 connector pinouts.

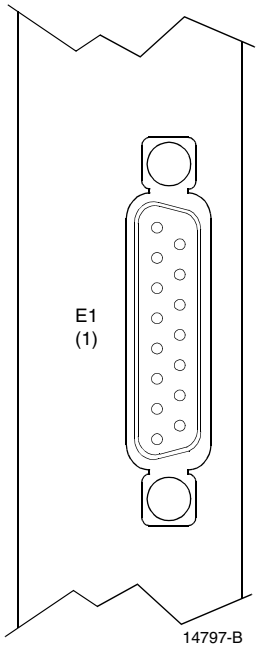


Figure 31: E1 Port

Table 9. E1 Cables and Adapters

PART NUMBER	DESCRIPTION OF CABLES
930xx122	DA15P to RJ48C modular plug
77892	DA15P to RJ48C socket adapter
77993003	DA15P to Barrier Strip adapter
930xx092	DA15P to DA15S
930xx134	DA15P to DA15P
77895001	75-ohm to 120-ohm adapter
P = plug (male); S = socket (female)	
xx is the cable's length in feet. Contact Kentrox for available lengths.	

1. Connect the cable to the port. Secure the cable connector to the panel with the screws built into the connector.

2. Connect the other end of the cable to the network or terminal equipment using the manufacturer or carrier instructions.

3.9.1 Maximum Cable Length

The maximum cable length end-to-end is 3655 ft. (1114 m): 655 ft. (199.6 m) maximum from transmitter to cross-connect and 3000 ft. (914.6 m) maximum from the first line repeater.

3.9.2 Using the 75-Ohm to 120-Ohm Adapter for E1

For sites using coaxial cable, a 75-ohm to 120-ohm adapter is available. Connect the adapter to the E1, D connector, then connect the transmit (TX) and receive (RX) cables as shown below. Each side of the adapter has a frame ground switch. Set one side of the adapter to frame ground (Earthed) and the other side to Open, to avoid a ground loop.

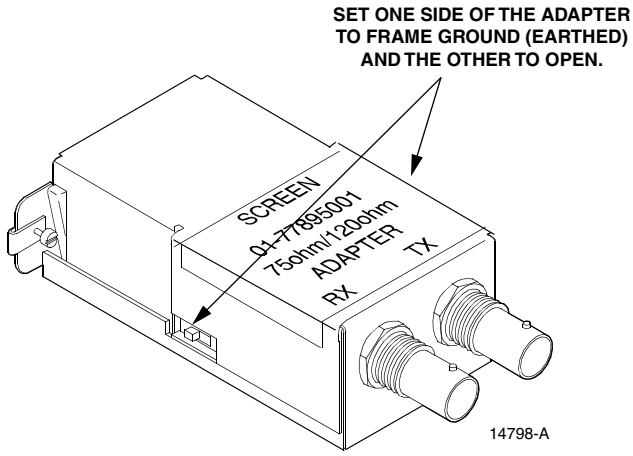


Figure 32: 75-Ohm to 120-Ohm Adapter for E1

3.10 OCTAL PLM/DSX-1 CABLING

The DSX-1 port receives and transmits data over a 100-ohm differential line, with 8-pin modular connectors (RJ48). See Appendix A for DSX-1, connector pinouts.

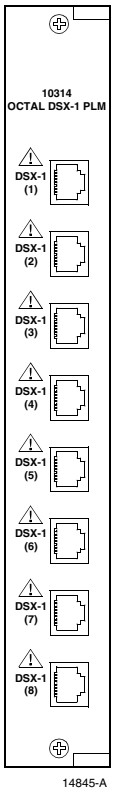


Figure 33: DSX-1 Port

Table 10. DSX-1 Cables and Adapters

PART NUMBER	DESCRIPTION OF CABLES
930xx143	RJ48C to RJ48C
930xx144	RJ48C to RJ48C Cross-over cable
P = plug (male); S = socket (female)	
xx is the cable's length in feet. Contact Kentrox for available lengths.	

1. Connect the cable to the port. Make sure that the retainer snaps firmly into place.

2. Connect the other end of the cable to the network or terminal equipment using the manufacturer or carrier instructions.

3.10.1 Maximum Cable Length

The maximum cable length is 655 ft. (199.6 m) from transmitter to cross-connect.

3.11 OCTAL AND QUAD PLM/DS1 CABLING

The DS1 port receives and transmits data over a 100-ohm differential line, with 8-pin modular connectors (RJ48). See Appendix A for DS1, connector pinouts.

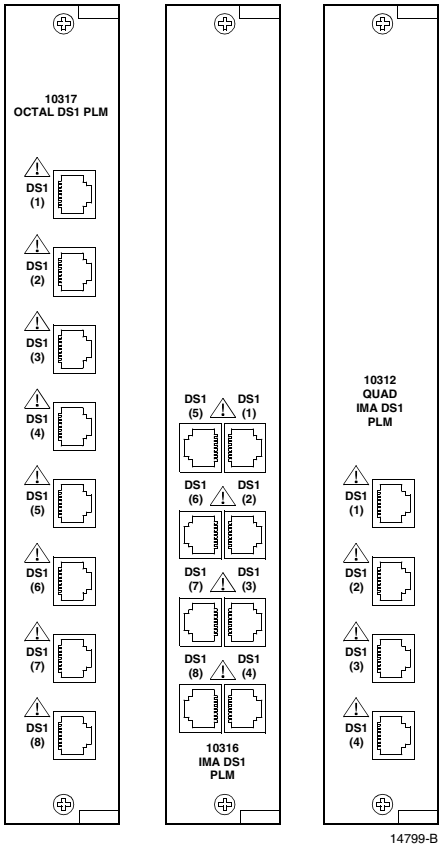


Figure 34: DS1 Ports

Table 11. DS1 Cables and Adapters

PART NUMBER	DESCRIPTION OF CABLES
930xx143	RJ48C to RJ48C
930xx144	RJ48C to RJ48C Cross-over cable
P = plug (male); S = socket (female)	
xx is the cable's length in feet. Contact Kentrox for available lengths.	

1. Connect the cable to the port. Make sure that the retainer snaps firmly into place.

2. Connect the other end of the cable to the network or terminal equipment using the manufacturer or carrier instructions.

3.11.1 Maximum Cable Length

The maximum cable length is 655 ft. (199.6 m) from transmitter to cross-connect.

3.12 OCTAL AND QUAD PLM/E1 CABLING

The E1 port receives and transmits data over a 120-ohm differential line with 8-pin modular connectors. See Appendix A for E1, connector pinouts.

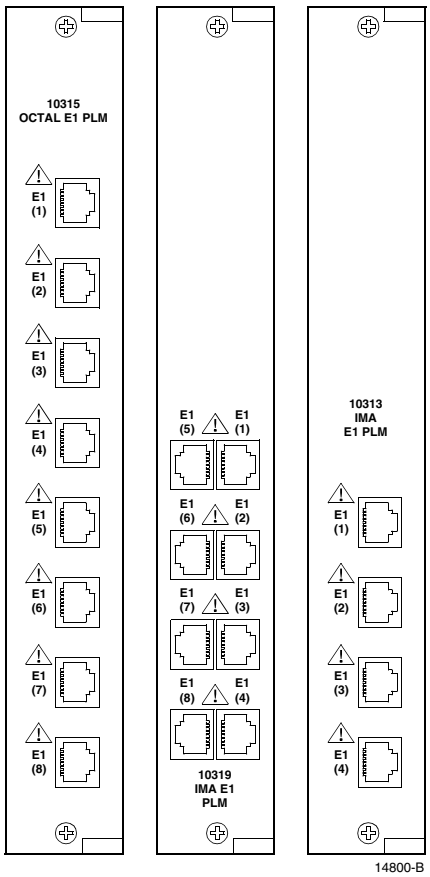


Figure 35: E1 Ports

Table 12. E1 Cables and Adapters

PART NUMBER	DESCRIPTION OF CABLES
930xx122	DA15P to RJ45
77900	RJ45 to 75-ohm dual-BNC adapter
P = plug (male); S = socket (female)	
xx is the cable's length in feet. Contact Kentrox for available lengths.	

1. Connect the cable to the port. Make sure that the connector snaps firmly into place.

2. Connect the other end of the cable to the network or terminal equipment using the manufacturer or carrier instructions.

3.12.1 Maximum Cable Length

The maximum cable length is 655 ft. (199.6 m) from transmitter to cross-connect.

3.13 V.35/EIA-530 CABLING

The V.35/EIA-530 port is a 25-pin female connector. The port can be configured using system software to provide a V.35 or EIA-530 compatible interface. The EIA-530 interface also supports EIA-449 (RS449) and X.21 pinouts with appropriate cabling. See Appendix A for V.35, EIA-530, and EIA-449 (RS449) pinouts.

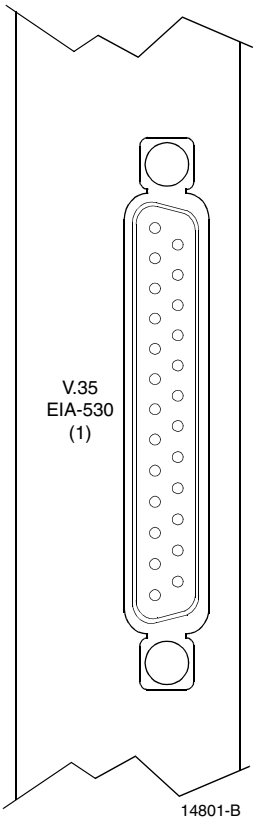


Figure 36: V.35/EIA-530 Port

Table 13. V.35 Cables and Adapters

PART NUMBER	DESCRIPTION OF CABLES
950xx054	DB25P to V.35 (MRAC34P)
78904	Adapter V.35: DB25P to MRAC34S
78906	Remove Timing Adapter V.35: DB25P to MRAC34S (required if DTE does not provide external clock to pins 11 and 24)

Table 14. EIA-530, EIA-449, X.21 Cables and Adapters

PART NUMBER	DESCRIPTION OF CABLES
950xx061	DB25P to DB25P EIA-530
950xx063	DB25P to DA15P X.21
950xx064	DB25P to DA15S X.21
78902	Adapter X.21: DB25P to DA15S
950xx066	DB25P to DC37P EIA-449 (RS449)
78901	Adapter EIA-449 (RS449): DB25P to DC37S
P = plug (male); S = socket (female)	
xx is the cable's length in feet. Contact Kentrox for available lengths.	

1. Connect the cable to the data port. Secure the cable connector to the panel with the screws built into the connector.
2. Connect the other end of the cable to the terminal equipment according to the manufacturer's instructions.

3.13.1 Maximum Cable Length

V.35— 50 ft. (15.2 m) for 1.544 Mbps rates
—4 ft. (1.2 m) for 4 Mbps for 1.544 Mbps rates
—2 ft. (0.6 m) for 8 Mbps for 1.544 Mbps rates
EIA-530—200 ft. (61 m)
X.21— 200 ft. (61 m)
EIA-449 (RS449)—200 ft. (61 m)

3.14 HSSI CABLING

The HSSI port receives and transmits data over a serial line through this 50-pin connector. See Appendix A for the HSSI connector pinout.

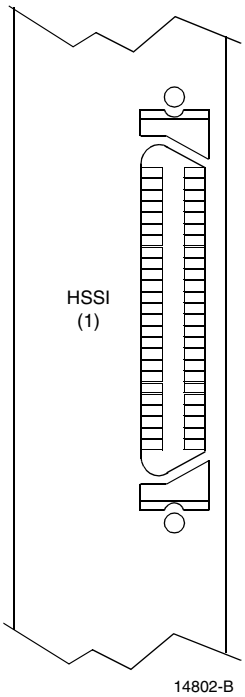


Figure 37: HSSI Port

Table 15. HSSI Cables and Adapters

PART NUMBER	DESCRIPTION OF CABLES
960xx011	HSSI Plug to HSSI Plug
96010012	Cable HSSI - Crossover, 10 ft.
xx is the cable's length in feet. Contact Kentrox for available lengths.	

1. Connect the cable to the data port. Make sure that the connector snaps firmly into place.

2. Connect the other end of the cable to the terminal equipment according to the manufacturer's instructions.

3.14.1 Maximum Cable Length

Maximum cable length is 50 ft. (15.6 m).

3.15 QUAD TTL CABLING

Each TTL port has four BNC (coaxial) connectors. The BNC cables typically terminate on a patch panel or bulkhead.

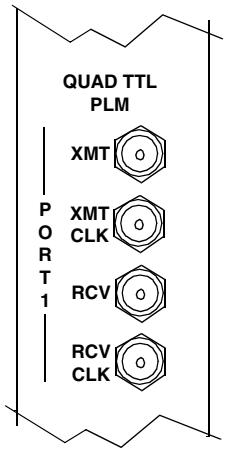


Figure 38: QTTL Port

Table 16. TTL Cables and Adapters

PART NUMBER	DESCRIPTION OF CABLES
960xx010	BNC Plug to BNC Plug
xx is the cable's length in feet. Contact Kentrox for available lengths.	

1. Connect a BNC cable between the input clock on the telemetry equipment and the XMT CLK connector for the selected port.
2. Connect a BNC cable between the clock out connector on the telemetry equipment and the RCV CLK connector for the selected port.
3. Connect a BNC cable between the data in connector on the telemetry equipment and the XMT connector for the selected port.
4. Connect a BNC cable between the data out connector on the telemetry equipment and the RCV connector for the selected port.

3.15.1 Maximum Cable Lengths

Maximum cable length is 175 ft. (53.3 m).

3.16 QUAD PORT ETHERNET CABLING

The Ethernet port receives and transmits data over a 10Base-T line, using Cat 3 or better grade cable, with 8-pin modular connectors. See Appendix A for Ethernet connector pinouts.

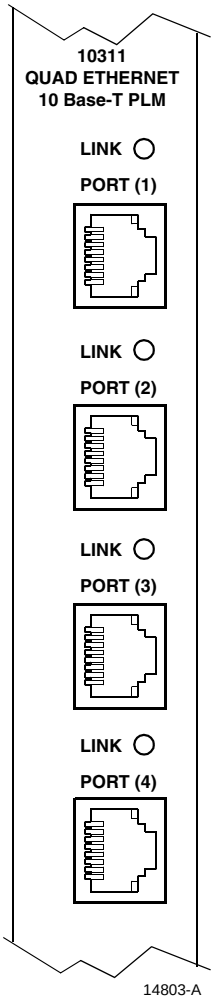


Figure 39: Quad Ethernet Ports

Table 17. Ethernet Cables and Adapters

PART NUMBER	DESCRIPTION
950xx077	RJ45 to RJ45 Cat 3. Unshielded Twisted Pair (straight 10Base-T cable when connected to a hub)
950xx078	RJ45 to RJ45 Cat 3. Unshielded Twisted Pair (cross-over 10Base-T cable when connected to an Ethernet station)
xx is the cable's length in feet. Contact Kentrox for available lengths.	

1. Connect the cable to the port. Make sure that the retainer snaps firmly into place.

2. Connect the other end of the cable to an Ethernet hub (or to an Ethernet station when using cross-over cable). Make sure the Link Integrity LED is ON.

3.16.1 Maximum Cable Length

The maximum cable length is 328 ft. (100 m) from transmitter to receiver.

CHAPTER 4: ADDING/REPLACING COMPONENTS

This section describes how to add or replace components in the AAC. The components described include:

- Integrated System Controller (ISC) module
- Service Data Module (SDM)
- Alarm module
- Protocol modules (PMs)
- Physical layer modules (PLMs)
- Power supplies

4.1 REPLACEABLE COMPONENTS

The chassis is designed to simplify maintenance and upgrading. Modules and power supplies may be added to or replaced in the chassis by qualified service personnel.

4.1.1 Hot-Pluggable Components

The following types of components can be added or replaced without powering down the chassis and disrupting traffic.

- SDMs
- PMs
- PLMs
- Power supplies (AAC-3 has two supplies)
- Power supply fan tray

4.1.2 Replaceable System Components that are not Hot-Pluggable

To ease maintenance, the following components are designed as replaceable, however, the AAC must be powered down before replacing these components. See Figure 40 on page 66.

- ISC module
- Alarm module
- Power supply (AAC-2 has one supply)

Caution: *Electrostatic discharge (ESD) is potentially damaging to circuitry in the AAC. Set up the work area to limit the effects of ESD. We recommend that you wear a ground strap when handling the modules and that you employ antistatic mats within the work area.*

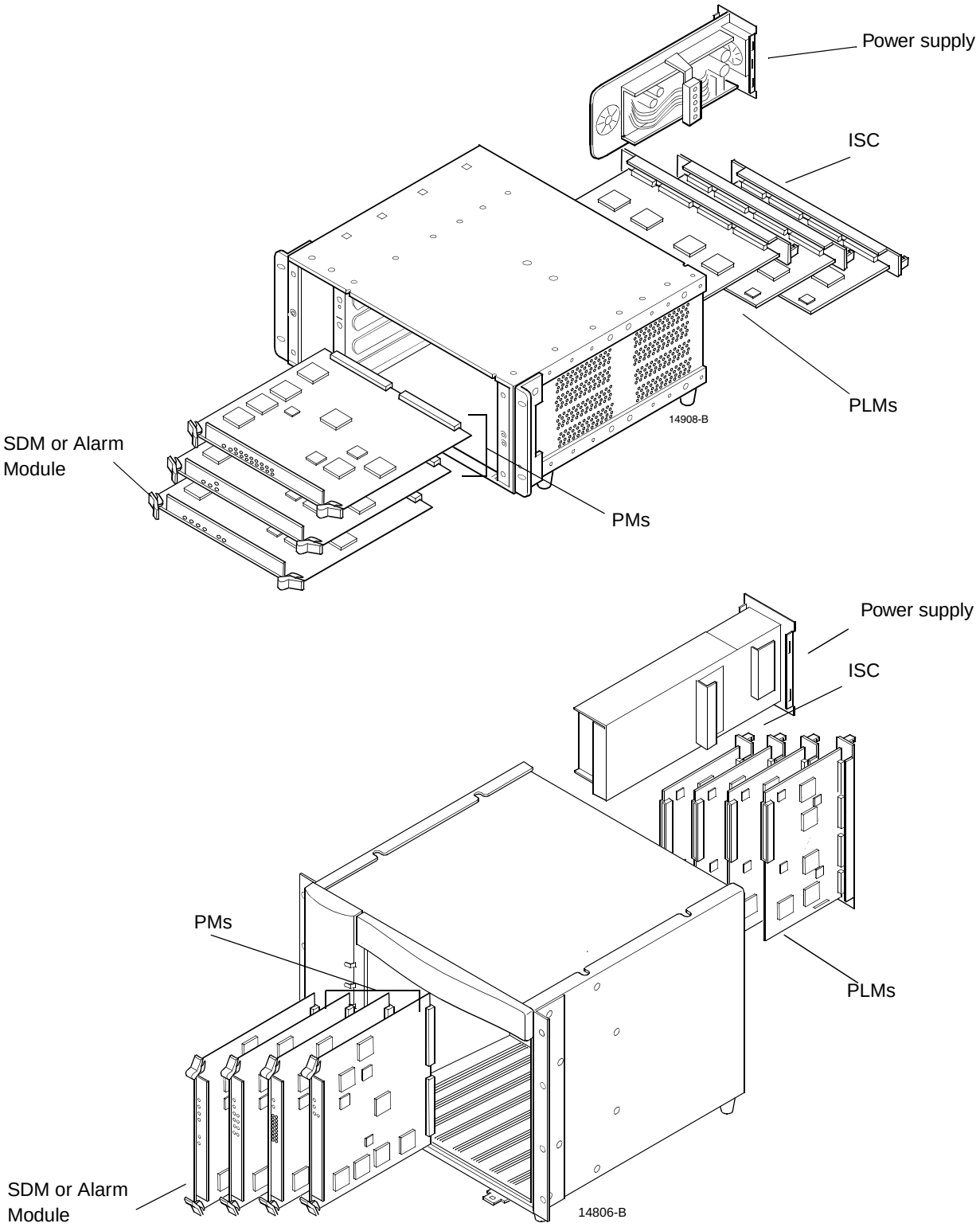


Figure 40: Replaceable components

4.1.3 Software Updates to Match New Modules

As new AAC components and features are introduced, software updates can be easily loaded into AAC memory. Procedures for loading the new software are provided with the updates and are available via anonymous FTP or over the Internet; they are not covered in this guide. Refer to the *AAC User's Guide* for more information.

4.2 INSTALLING THE AAC-3 FRONT-PANEL LATCH GUARDS

If the AAC-3 is installed in an non-controlled access location and the chassis has two installed power supplies, front-panel latch guards must be installed. These guards prevent the chassis front cover from being removed easily. They help ensure limited access to the chassis and are a safety requirement in a non-controlled access location.

A controlled access area must be readily accessible to equipment operators as well as equipment service personnel. In a controlled access location, it is not necessary to install the front-panel latch guards.

⚠ **Warning:** *When two power supplies are installed, energy levels in the internal chassis may exceed 240 VAC. Access to the internal chassis card cage is restricted to trained and qualified service personnel. If the chassis is installed in a non-controlled access location, the chassis front-panel latch guards must be installed as instructed below.*

To install the chassis front-panel latch guards (see Figure 41 and Figure 42):

1. Place your fingers in the latch indentations on the bottom left and right corners of the chassis cover.
2. Press up on these indentations to release the cover latches, then pull the bottom of the cover away from the chassis.
3. Pull the cover down and off the chassis.
4. Each latch guard is supplied with two flat-head screws. Use these screws to attach the guards onto the bottom of the chassis. The chassis may need to be tilted up slightly to install the guards.

⚠ **Caution:** *Never place the chassis on its rear, side, or top panels.*

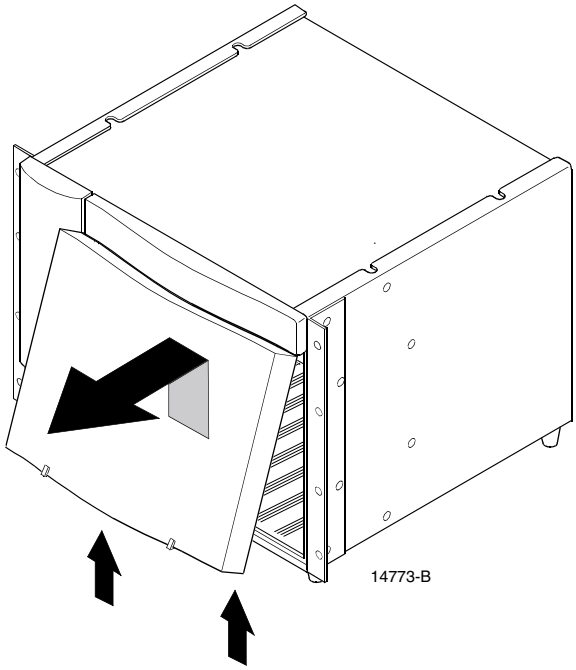


Figure 41: Removing front cover without latch guards

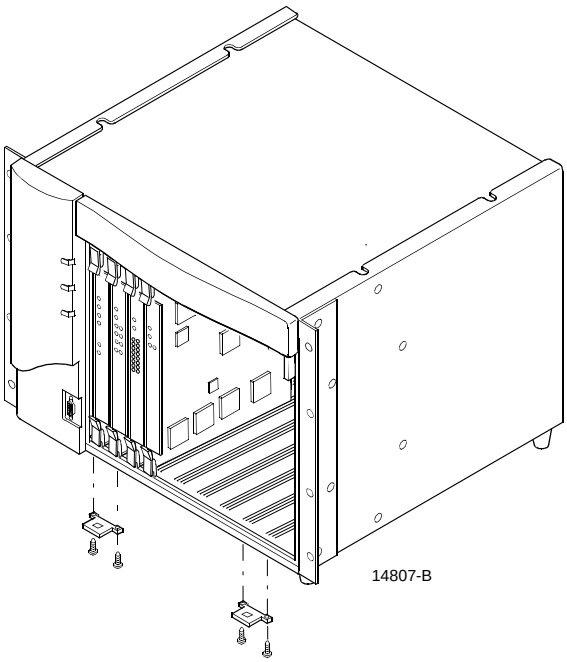


Figure 42: Latch guards

4.2.1 Removing/Replacing the AAC-3 Front Cover with Latch Guards

Once the chassis front-cover latch guards are installed, a tool is required to remove the chassis front cover. See Figure 43.

1. Insert a small flat-blade screwdriver into one of the latch rests located in the bottom corners of the cover. Push up on the latch through the hole in the latch guard, then pull that corner of the cover away from the chassis.
2. Insert the screwdriver into the latch rest on the opposite corner of the cover. Push up on the latch through the hole in the latch guard, then pull that corner of the cover away from the chassis.
3. Pull the cover down and off the chassis.

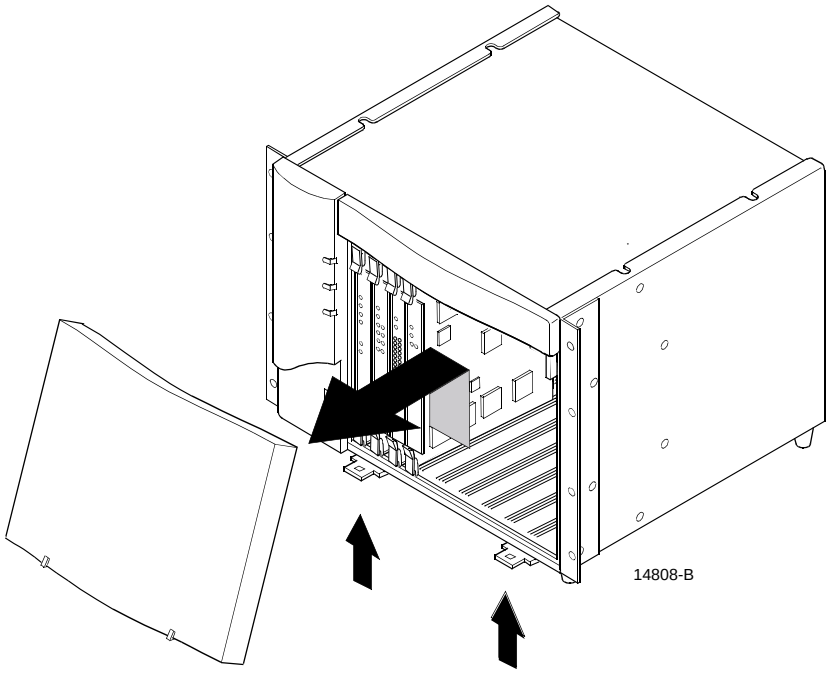


Figure 43: Removing front cover with latch guards

4.2.2 Replacing the Front Cover

To replace the chassis cover. See Figure 44.

1. Insert the guides on the top edge of the cover into the matching slots on the bottom edge of the chassis top panel.
2. Once the guides are inserted, push the bottom of the cover onto the chassis until the cover latches snap into place.

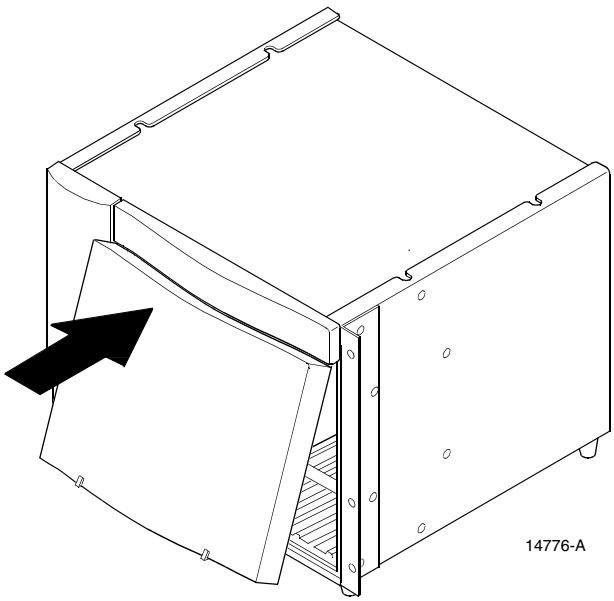


Figure 44: Replacing front cover

4.3 POWERING DOWN THE AAC

Certain component replacements require that the AAC be powered down. The AAC can do this in a "controlled" manner that simplifies the reboot once the new component is in place.

Power down before replacing any of the following components:

- ISC module
- Alarm module
- Power supply (if only one power supply is installed in the chassis)

The first step in powering down the AAC is to halt the system from the user interface. This type of halt does three things. It logs out all users, it synchronizes the FLASH memories and the nonvolatile configuration database so that they all contain the most recent changes, and it stops the data flow within the system. If the AAC is not halted before removing power, configuration changes made within the last 60 to 90 seconds may not be saved.

Note: The system can only be halted by a terminal connected to the COMM port. A halt cannot be executed by a Telnet session since doing so would disconnect the session.

Caution: *A halt disrupts service.*

To halt the system:

1. Log in as Super User.
2. Display the AAC System Configuration form.
3. Tab to the [Utilities...] button and press Enter. See Figure 45.
4. In the AAC System Utilities form, tab to the [Halt System] button and press Enter. A confirmation screen will be displayed. See Figure 46.

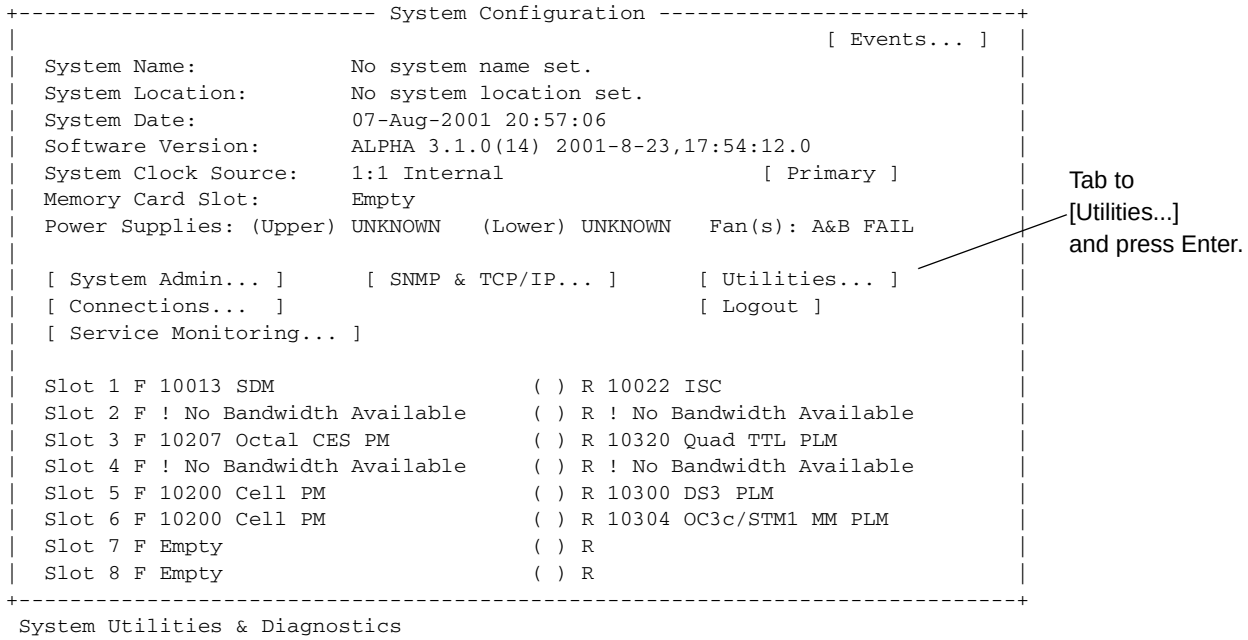


Figure 45: Path to System Utilities form

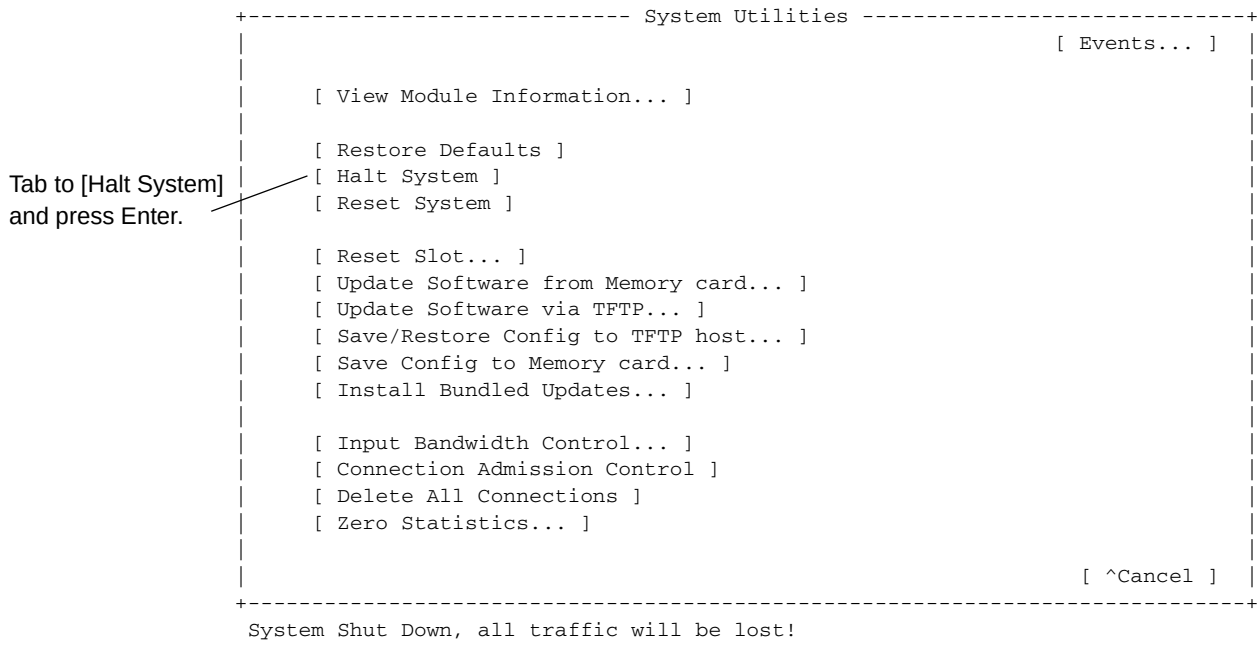


Figure 46: System Utilities form

Once the system has been halted, unplug the power cable(s) to complete the process.

4.4 REBOOTING THE AAC

4.4.1 Selecting the Source of the Restored Configuration

The AAC default is to load the most recently-saved configuration database upon bootup. If the Integrated System Controller or Alarm module are replaced, override this default and force the AAC to ask which database to load.

The AAC saves its configuration database in two FLASH banks: one on the ISC and one on the Alarm module. Load the database from whichever module that is not replaced.

To set up the AAC so that it asks which database to load, set software configuration DIP switch 3 to the “up” position. This DIP switch is located on the ISC. See Figure 47.

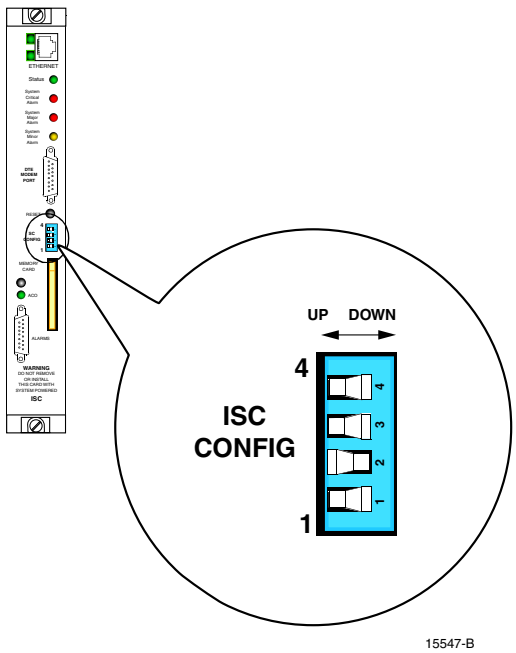


Figure 47: ISC configuration DIP switch

4.4.2 Rebooting the AAC

Once the switch is set correctly, reconnect the power cables to the AAC.

The AAC powers up and runs through the initial diagnostics. It will then pause and list the available start-up configuration options. Select the database to load by entering the appropriate letter, in upper or lower case. See Figure 48. Table 18 describes the options that may be available.

Note: If the system was not halted before removing power, some options may not be available, depending on whether or not the memories and configuration databases were in sync at the time of the power loss.

```
            STARTUP CONFIGURATION OPTIONS:

F   -- Set factory defaults
S   -- Use configuration dated <date> from ISC FLASH
SP  -- Use configuration dated <date> from ISC FLASH
       but reset passwords to factory defaults
C   -- Use configuration dated <date> from Memory Card
CP  -- Use configuration dated <date> from Memory Card but
       reset passwords to factory defaults
A   -- Use configuration dated <date> from Alarm Module or SDM
AP  -- Use configuration dated <date> from Alarm Module or SDM
       but reset passwords to factory defaults
```

Figure 48: Startup Configuration Options

Table 18. Start-Up Configuration Options

LETTER	DESCRIPTION
F	This resets all configuration parameters to their factory defaults, including passwords.
S	This loads the last configuration saved in the FLASH memory of the Integrated System Controller (ISC).
SP	This loads the last configuration saved in the FLASH memory of the ISC, except for the passwords, which are reset to factory defaults.
C	This loads the configuration saved in the memory card. (This option is available when the memory card is present.)
CP	This loads the configuration saved in the memory card, except for the passwords, which are reset to factory defaults. (This option is available when the memory card is present.)
A	This loads the last configuration saved in the Alarm module or SDM. (This option is available when an Alarm module or SDM is present.)
AP	This loads the last configuration saved in the Alarm module or SDM, except for the passwords, which are reset to factory defaults. (This option is available when an Alarm module or SDM is present.)

Once the letter of the desired configuration option has been entered, the AAC prompts for DIP switch 3 be reset to the default position of “down.” The DIP switch must be reset to the default position for the AAC to continue the reboot procedure.

After the reboot, log back in.

4.5 UPGRADING FROM THE SC TO THE ISC

For instructions on replacing the System Controller and Extension Module with the Integrated System Controller, see the *ISC Upgrade Instructions* document. This document describes:

- Saving your existing configuration via TFTP and restoring it on the newly installed ISC.
- Powering down the AAC before removing and installing the modules.
- Restoring IP connectivity after the installation.

4.6 INSTALLING THE ALARM MODULE

The Alarm module is used with an ISC only. A good time to install the Alarm module is during the ISC upgrade immediately before restoring power to the AAC. (See the *ISC Upgrade Instructions* document.)

To install or replace an Alarm module at a later time:

1. Remove the chassis front cover.
2. Remove the current Alarm module from slot 1. Open the ejector tabs on the module. Pull the module straight out.

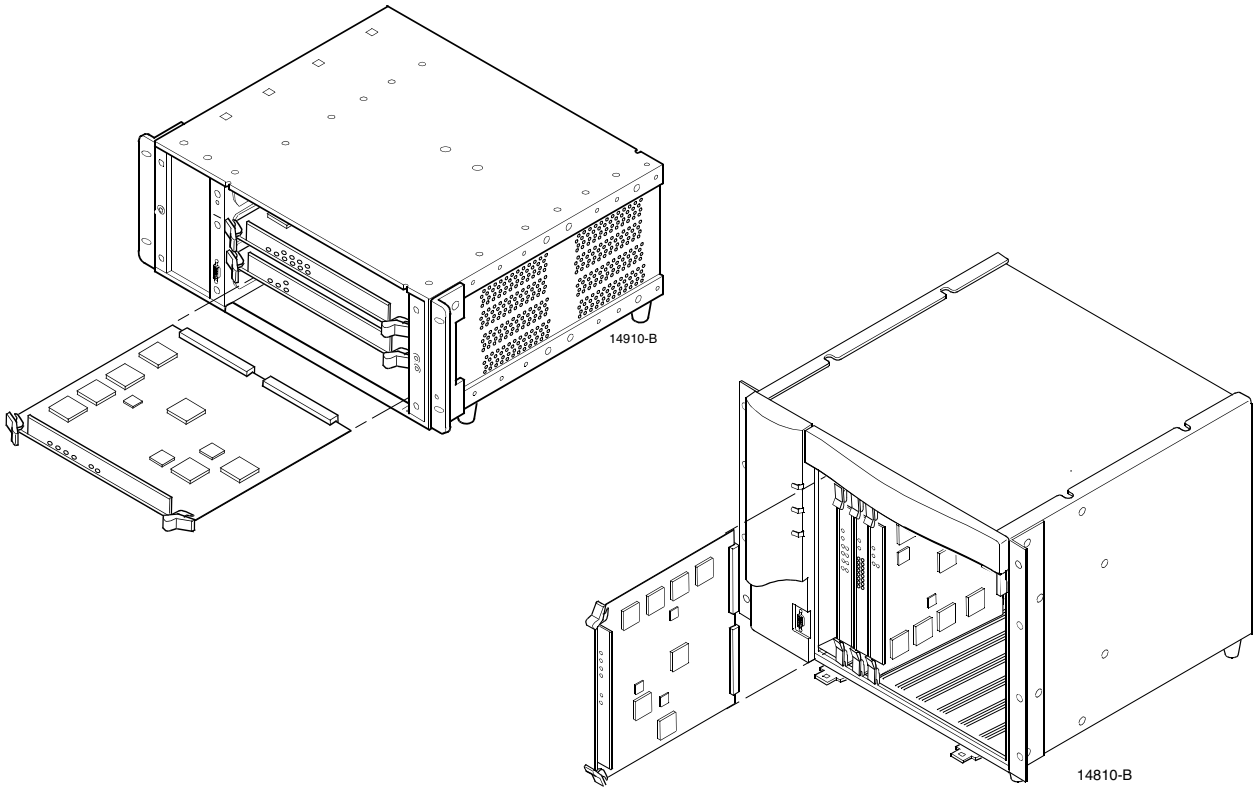


Figure 49: Removing and Installing the Alarm Module

3. Install the Alarm module in slot 1. Align the module edge with the top and bottom guides in the slot. Press the module into place until the edge connector snaps into the connector on the midplane. The ejector tabs should be flush when the module is in place.
4. Replace the chassis front cover.

See "Selecting the Source of the Restored Configuration" on page 73 for instructions on copying the configuration stored on the Alarm module to the ISC at bootup.

4.7 INSTALLING PROTOCOL MODULES AND THE SDM

PMs and the SDM are “hot-pluggable.” It is not required to power down the chassis to remove or install one, but it can cause a temporary service interruption.

PMs and the SDM are installed in the front of the chassis. To install a PM or SDM, follow the procedure below. See Figure 50.

⚠ **Caution:** *Slot 1 on the front of the chassis is reserved for the Alarm module or SDM. Note that you can only install one SDM per AAC.*

⚠ **Caution:** *Always install the SDM in slot 1. If an SDM is inserted into any other slot, damage to the chassis or SDM may result.*

⚠ **Caution:** *Never install a PM in slot 1, as damage or overheating may result.*

1. Remove the chassis front cover.
2. When replacing a module, unseat and remove the old module. Open the ejector tabs at the top and bottom of the module. Then pull the module straight out.
3. Insert the new module. Align the module edges with the top and bottom guides in the slot.
4. Open the ejector tabs.
5. Press the module into place until the edge connector seats into the midplane.
6. The ejector tabs should be flush when the module is seated.

➧ **Note:** Make sure that the ejector tabs are open before seating the module. If the tabs are not open, the module WILL NOT seat properly. (The tabs must engage the flanges on the chassis.)

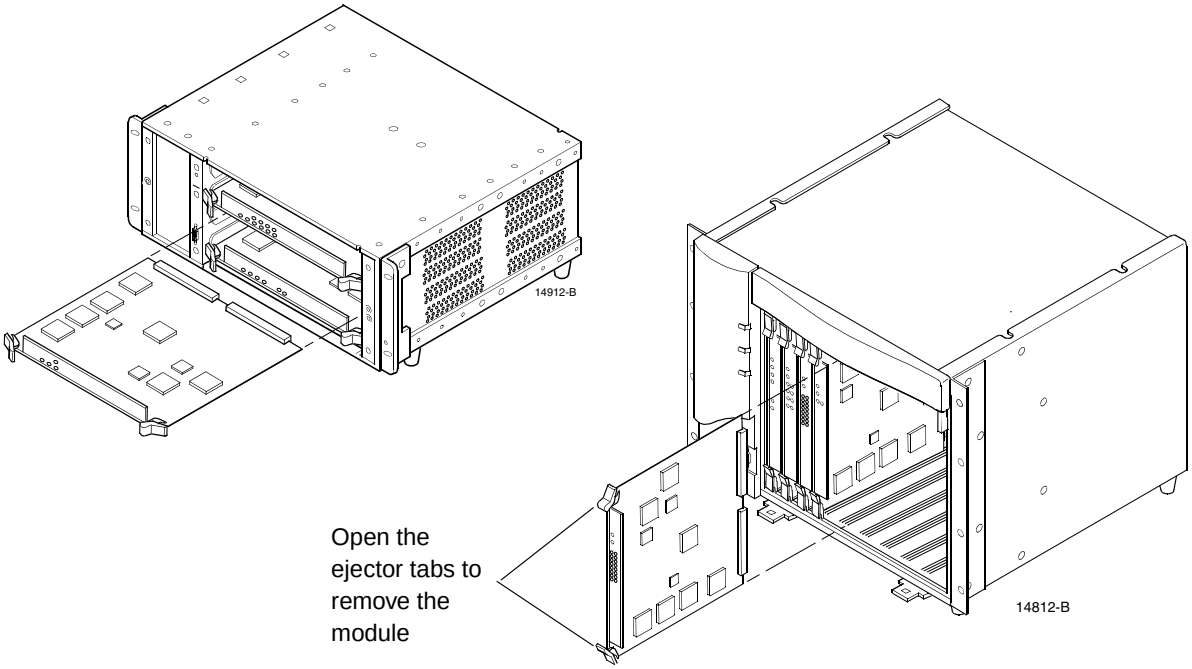


Figure 50: Removing a PM

PMs and PLMs can boot up and appear to work properly but data may not pass correctly if the modules are not fully seated. Push firmly on the tabs to seat each module.

If a number of modules are hot-inserted simultaneously, some modules may not boot properly. If this happens, let the system settle and then, one at a time, pull and reinsert the modules that did not boot, letting each module fully boot before moving the next. If one to two minutes of outage is acceptable, newly installed modules may be recovered by resetting the chassis.

7. Replace the chassis front cover.

4.8 INSTALLING PHYSICAL LAYER MODULES

PLMs are installed in the back of the chassis. To install a PLM, follow the procedure below. See Figure 51 and Figure 52.

Caution: *Slot 1 of the chassis is reserved for the ISC module.*

1. When adding a new module, remove the cover plate from the empty slot. Loosen the screws and remove the cover plate.

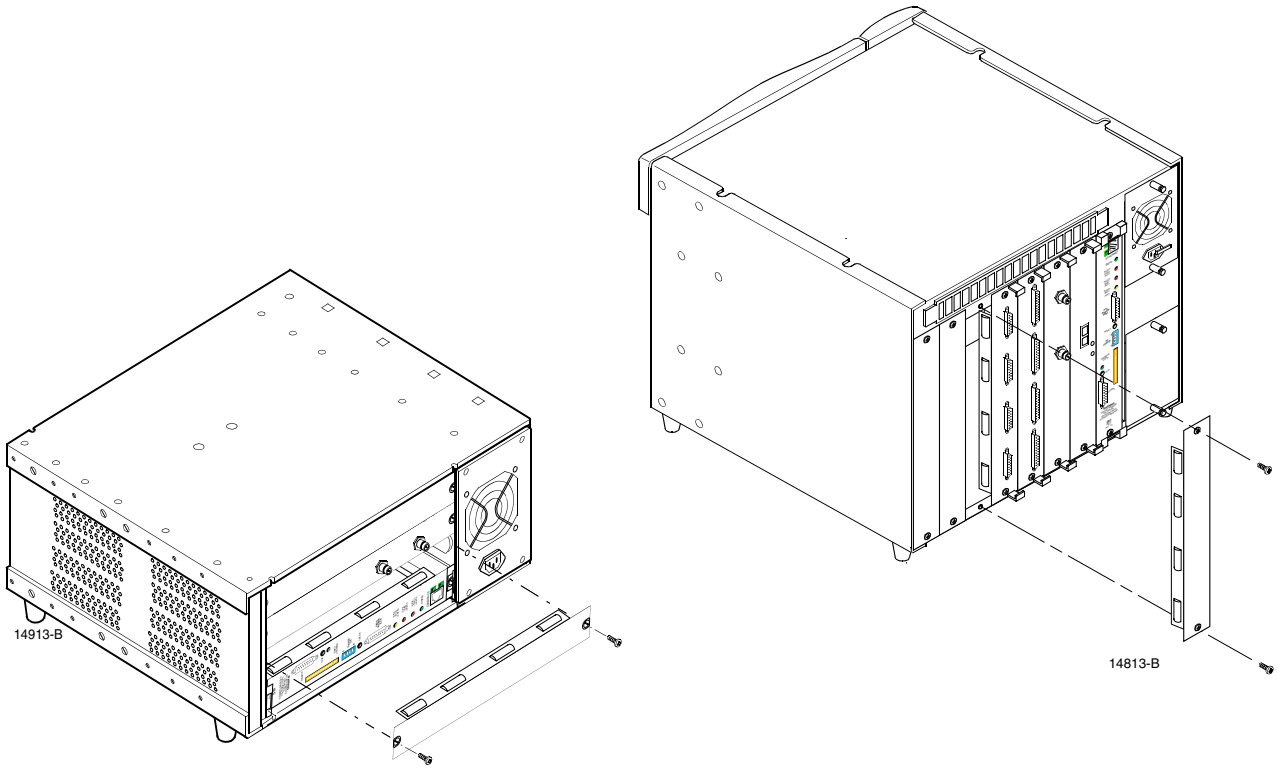


Figure 51: Remove Cover Plate

Warning: *Leave cover plates installed on empty slots during normal operation to ensure conformance to EMI, ESD, and safety standards.*

2. When replacing an existing module, remove the module. Loosen the screws on the module, then pull the module straight out.

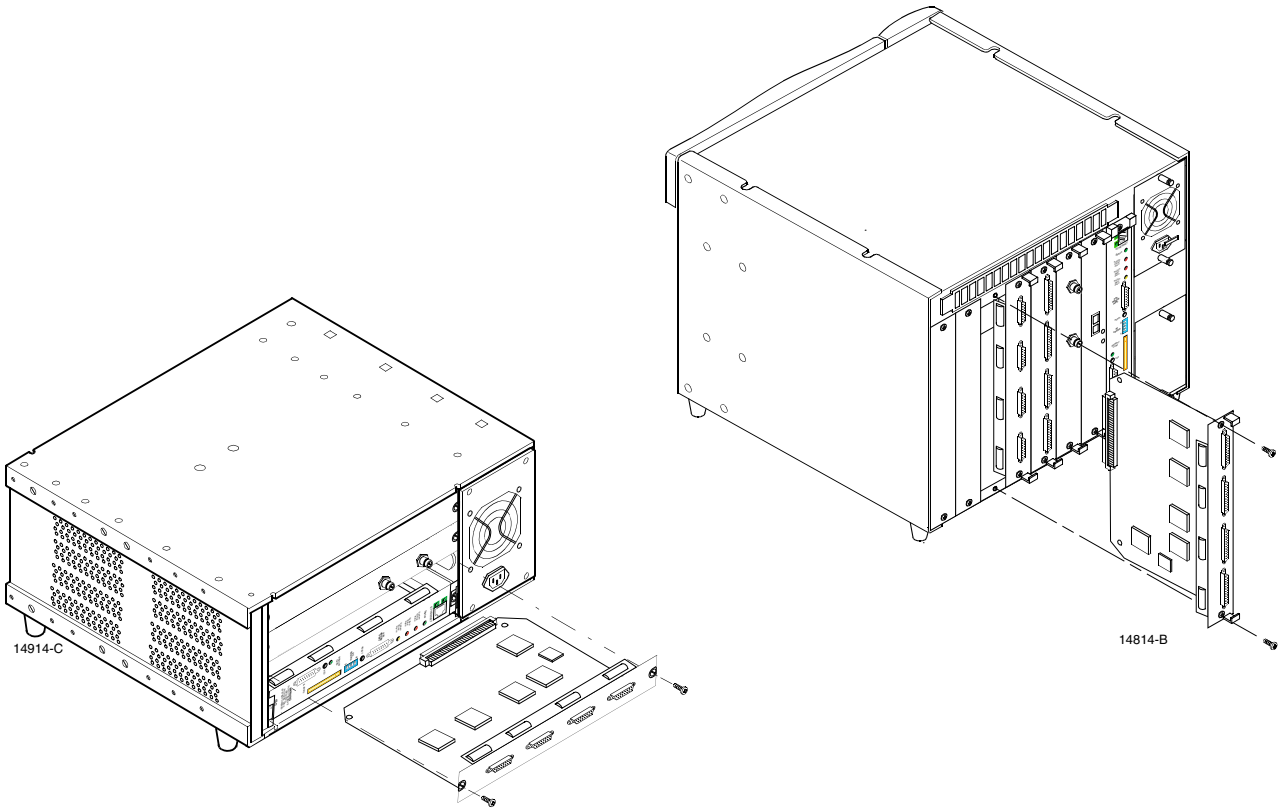


Figure 52: Physical Layer Module

3. Install the new module. Align the module edge with the guides in the slot.
4. Slide the module into place until the edge connector seats into the midplane.
5. Tighten the retainer screws.

Note: When installing PLMs, seat all modules before tightening any retainer screws since this tends to push each successive module a little off center.

4.9 VERIFYING THE MODULE INSTALLATION

After installing a module, login and check the System Configuration form for error messages. The following subsections describe causes and resolutions for potential error messages.

4.9.1 Resolving a Configuration Mismatch

When an existing module is replaced with a different type (but one that is compatible with the paired module), the message "`! PM (PLM) Configuration Mismatch`" appears in the System Configuration form. Tab to the slot and press Enter; a form appears asking if previous configuration and connections should be deleted. If the previous settings are not to be deleted, remove the new module and replace it with one of the original type.

4.9.2 Resolving an Invalid PM/PLM Combination

When an existing module is replaced with a new one that is not compatible with its paired module, the message "`! Invalid PM/PLM Combination`" appears in the System Configuration form. The new module must be replaced with one that is compatible with the paired module. For more information on supported module pairs, refer to the "Module Compatibility Map" on page 98.

4.9.3 Resolving a Remove Module Message

When a module-pair is removed, the connections associated with the ports on those modules must be deleted to free-up the slot for other modules. To do this, use the System Configuration form. The message "`! Removed` *`module`*" appears in the slots for the modules that were removed. Tab to the slot and press Enter. A form appears allowing the port connections and configuration parameters to be deleted. The slot is returned to an "`Empty`" status.

4.9.4 Resolving a No Bandwidth Available Message

The AAC has a fixed amount of cell bus bandwidth for passing data between ports. For each installed module, cell bus bandwidth is allocated for the port or ports on the module.

When the installed modules require more cell bus bandwidth than is available, the system cannot allocate bandwidth to some modules. In this case, the message "`! No Bandwidth Available`" appears in the System Configuration form. The LEDs on the affected module will be off and the ports disabled.

4.9.4.1 SDM, Packet PM, and Quad Ethernet PM

The input bandwidth on the SDM, Packet PM, and the Quad Ethernet PM can be adjusted. See Adjusting Input Bandwidth below.

⚠ **Caution:** *Lowering the bandwidth requirement for these modules can have serious consequences. For more information, refer to the Selecting Modules chapter of the AAC Planning Guide.*

4.9.4.2 Other Modules

For all other PMs, modules must be removed until the chassis accepts the remaining modules.

When Modules that show: "`! No Bandwidth Available`" are removed no change occurs to the input bandwidth allocations.

When a module with assigned bandwidth is removed to activate one that shows: "`! No Bandwidth Available,`" first remove the module with the assigned bandwidth, and then delete its configuration (if any).

The chassis will then activate modules that show: "`! No Bandwidth Available,`" when sufficient bandwidth has been freed.

4.9.5 Adjusting Input Bandwidth

The input bandwidth for the SDM or for module-pairs that include the Packet PM and the Quad Ethernet PM can be adjusted. The input bandwidth for a module-pair should be reduced only if sufficient input bandwidth is otherwise unavailable, or to avoid overflowing the lower-bandwidth end of a connection.

In some cases, the default allocations for some module combinations may exceed the amount of available cell bus bandwidth, making them impossible to configure. For example, the default bandwidth allocation for the Quad Ethernet PM assumes all four ports will be used. If only two ports are used, the input bandwidth can be reduced by 50 percent.

Adjust input bandwidth as follows:

1. Open the Utilities form by selecting [Utilities...] in the System Configuration form. See Figure 45.
2. In the System Utilities form, tab to [Input Bandwidth Control...] and press Enter. See Figure 46.

A form similar to the one shown below appears. See Figure 53.

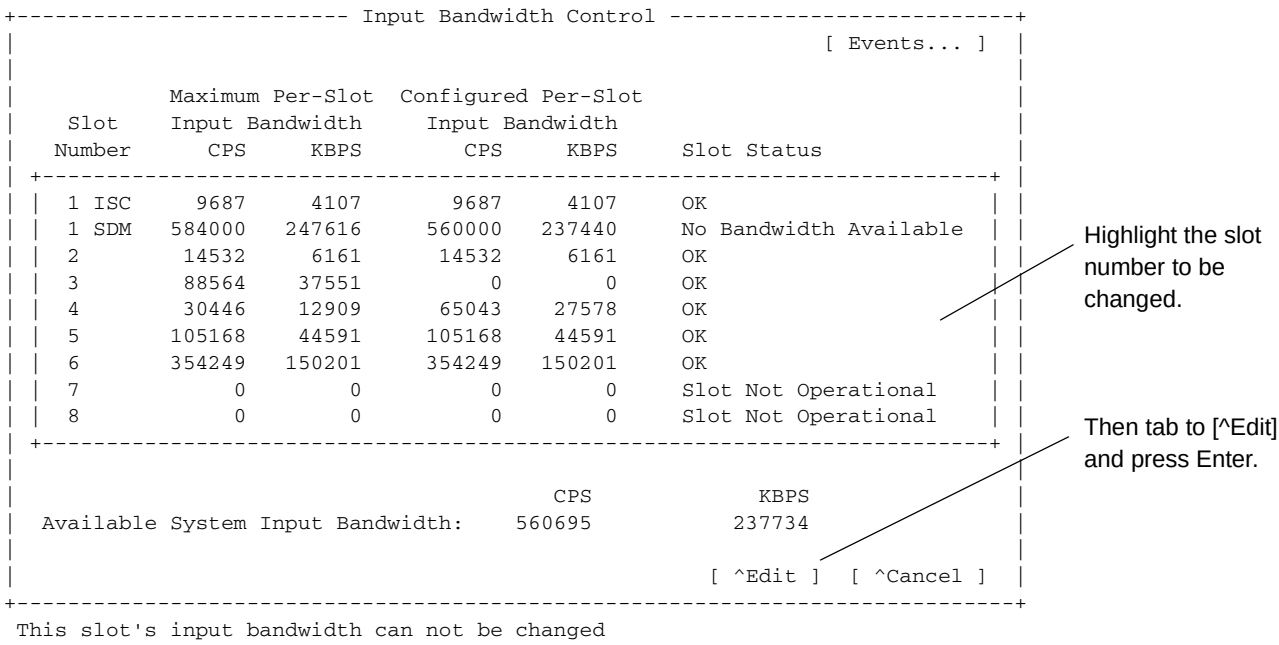


Figure 53: Input Bandwidth Control form

The Input Bandwidth Control form lists all modules in the chassis with their maximum allowable bandwidth and the currently allocated bandwidth. The numbers are shown in both cells-per-second (CPS) and kilobits-per-second (KBPS).

3. Select the appropriate slot and then select [^Edit]. A form like Figure 54 opens.

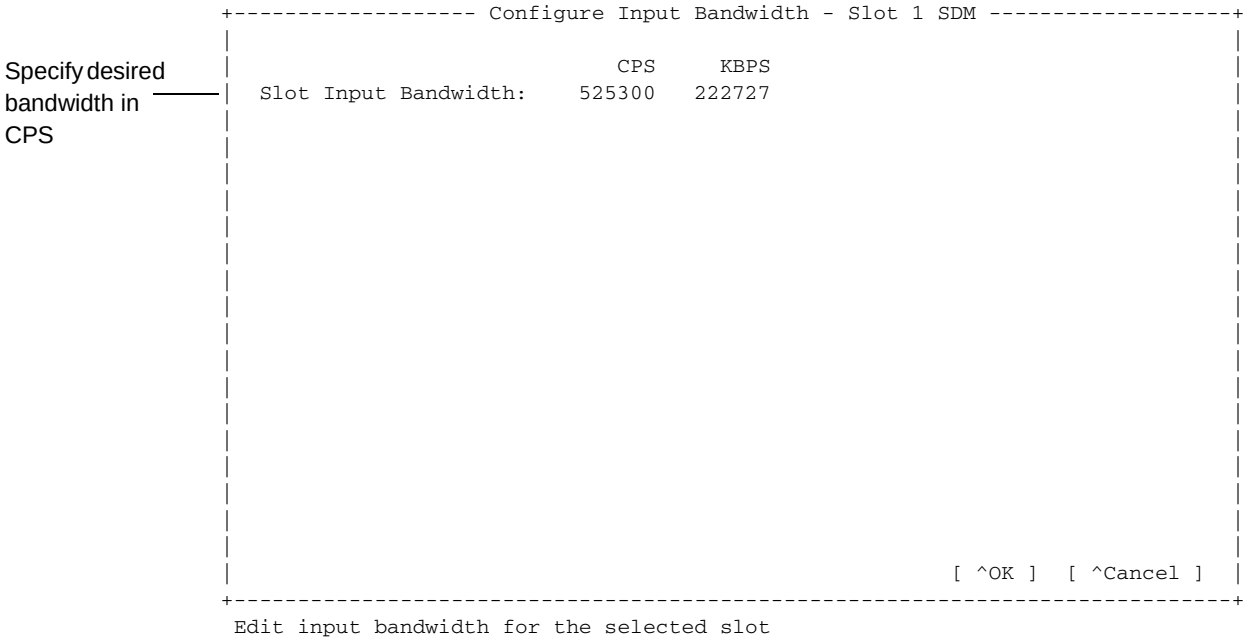


Figure 54: Slot Input Bandwidth Control form

4. Specify the desired input bandwidth in cells-per-second and then select [^OK] to accept the new setting.

In the Input Bandwidth Control form, the Current Per-Slot Input Bandwidth field will be updated, and the Available System Input Bandwidth field will display the new total cell-bus bandwidth available for allocation. If any slot had a status of "`! No Bandwidth Available`," the AAC allocates the available system input bandwidth to that slot and, if enough bandwidth was available, changes its Slot Status field to "OK".

Note: The minimum allowable input bandwidth for the Quad Ethernet PM is 1208 cps (512 kbps).

4.9.6 Delete Extra Connections Before Moving an ISC from an AAC-3 to an AAC-2

When an ISC is moved from an AAC-3 chassis to an AAC-2 chassis, connections on slots 5 through 8 are not automatically deleted. If these connections are not deleted and new connections are added anywhere on the AAC-2 chassis, problems may be experienced.

To avoid these problems, use one of the following procedures when moving an ISC from an AAC-3 to an AAC-2 chassis,:

- While the ISC is in the AAC-3, remove the modules in slots 5 through 8 one-by-one. Each time a module is removed, a dialog appears to confirm the operation. Select "`Confirm`" to remove the connections. Or...
- When the ISC is installed in the AAC-2 chassis, open the Systems Utility form and select "`Restore Defaults`." This clears all connections and returns all user-configurable items to the factory defaults.

4.10 ADDING OR REPLACING A POWER SUPPLY

4.10.1 AAC-2

Power must be removed from the chassis before the power supply is removed or replaced.

4.10.2 AAC-3

⚠ **Warning:** *To avoid the hazard of electrical shock, never install or remove a power supply that is connected to a power source and receiving power. High voltages may be present.*

AAC-3 power supplies are "hot-pluggable." In other words, the chassis can be powered from one power supply while the second power supply is removed or installed.

If there is only one power supply and that supply fails, replace that supply, then reboot the chassis. If the supply is failing but hasn't yet failed completely, install a new power supply in the second power slot and connect it to a power source before removing the first supply. This avoids a loss of power.

⚠ **Warning:** *Leave cover plates installed on empty rear slots during normal operation to ensure conformance with EMI, ESD, and safety standards.*

To install a power supply (see Figure 55):

1. Power down the AAC if there is only one power supply. Otherwise, leave power on the chassis.
2. Detach the power cord from the supply being removed.

   Note: For a DC supply, remove the power at the source before disconnecting the power cord.

3. Remove the supply from the chassis. Loosen the screws at the top and bottom of the supply. Pull the supply straight out of the chassis.

4. Install the new supply. Align the supply with the top and bottom guides in the slot. Press the supply into place until the connector snaps into the connector on the midplane. Tighten the screws that hold the supply in place.
5. If the new supply is the only supply, reboot the chassis. If the supply is the second, simply plug in the power cord.

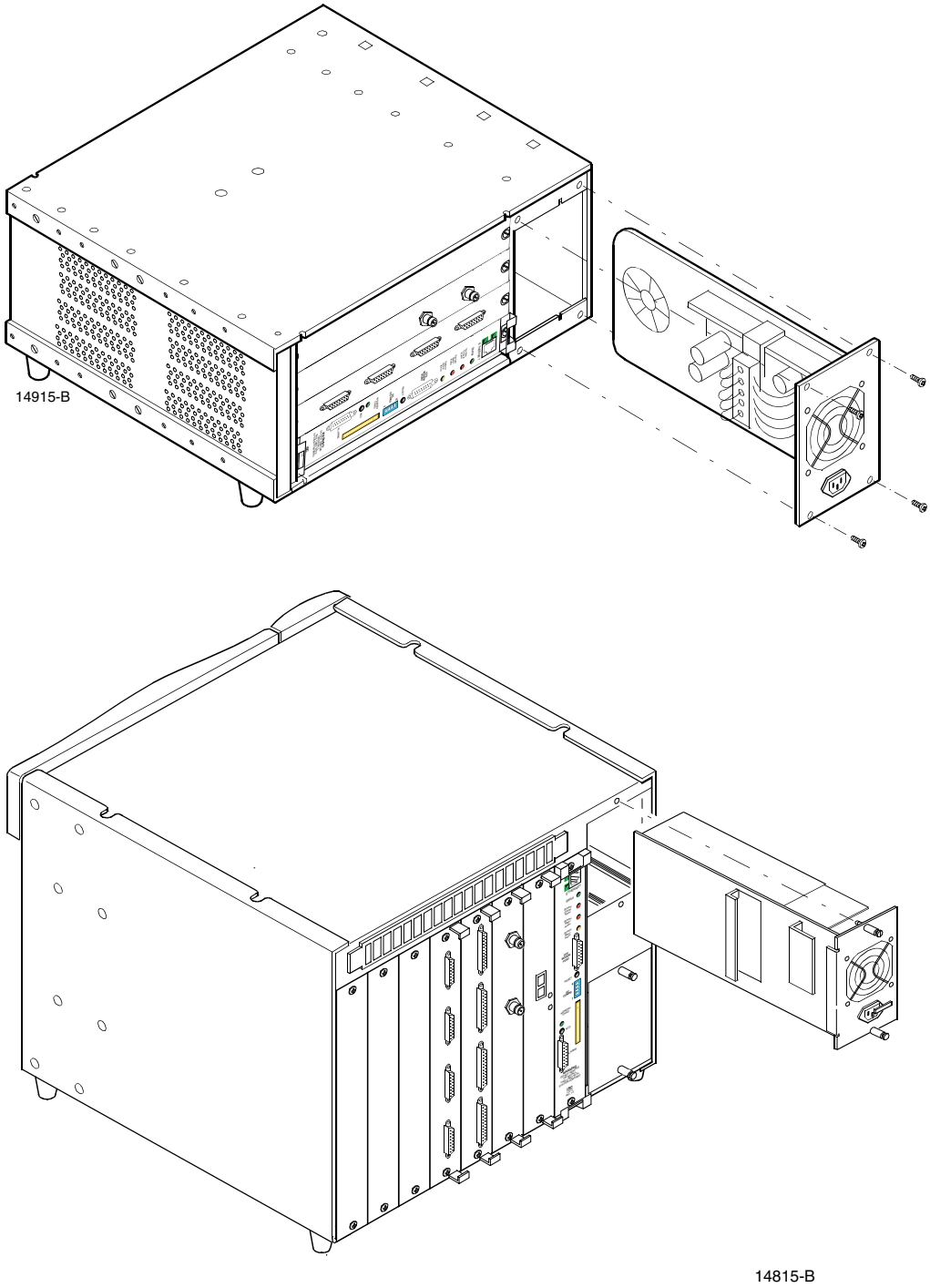


Figure 55: Power Supply Locations

APPENDIX A: CONNECTOR PINOUTS

A.1 DCE COMM PORT, DB-9 PINOUT

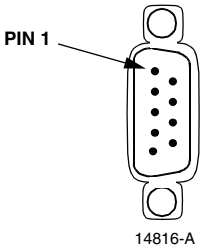


Table 1: DCE COMM Port Pinout

PIN	SIGNAL NAME	SOURCE	DIRECTION
1	Rec Sig Det (DCD)	DCE	Output
2	Received Data	DCE	Output
3	Transmit Data	DTE	Input
4	DTE Ready (DTR)	DTE	Input
5	Signal GND		
6	Data Set Ready (DSR)	DCE	Output
7	Request To Send (RTS)	DTE	Input
8	Clear To Send (CTS)	DCE	Output
9	Unused		

A.2 ISC DTE MODEM PORT, DB-9 PINOUT

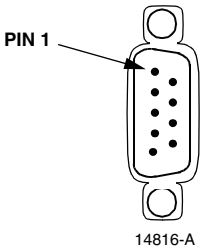
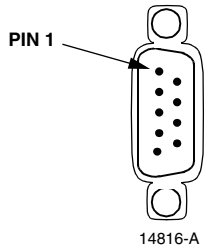


Table 2: ISC DTE Modem Port Pinout

PIN	SIGNAL NAME	SOURCE	DIRECTION
1	Rec Sig Det (DCD)	DCE	Input
2	Received Data (RXD)	DCE	Input
3	Transmit Data (TXD)	DTE	Output
4	DTE Ready (DTR)	DTE	Output
5	Signal Ground (GND)		
6	Unused		
7	Request To Send (RTS)	DTE	Output
8	Clear To Send (CTS)	DCE	Input
9	Unused		

A.3 ISC ALARMS PORT, DB-9 PINOUT

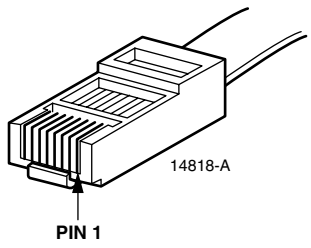
Table 3: ISC Alarms Port Pinout, All Normally Open



PIN NUMBER	SIGNAL NAME
1	Audible Critical
2	Audible Major
3	Audible Minor
4	Audible Common
5	Unused
6	Visual Critical
7	Visual Major
8	Visual Minor
9	Visual Common

A.4 10BASE-T ETHERNET, 8-PIN PINOUT (RJ-45)

Table 4: 8-Pin Modular Connector Pinout, 10Base-T Ethernet



PIN NUMBER	SIGNAL NAME
1	Tx+
2	Tx-
3	Rx+
4	Not used
5	Not used
6	Rx-
7	Not used
8	Not used

A.5 DSX-1, DA-15 PINOUT

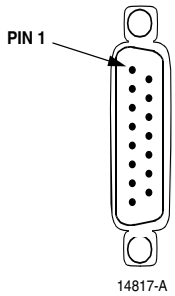


Table 5: DSX-1 Port Pinout

PIN NUMBER	CIRCUIT NAME	DIRECTION
1	Rx Data (T1)	Input
2	Frame ground and shield	
3	Tx Data (T)	Output
4	Frame ground and shield	
9	Rx Data (R1)	Input
11	Tx Data (R)	Output
5,6,7,8,10,12,13,14,15	Unused	

A.6 E1, DA-15 PINOUT

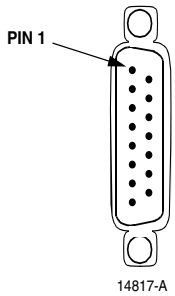


Table 6: E1 DA-15 Port Pinout

PIN NUMBER	CIRCUIT NAME	DIRECTION
1	Tx Data (T1)	Output
2	Frame ground and shield	
3	Rx Data (T)	Input
4	Frame ground and shield	
9	Tx Data (R1)	Output
11	Rx Data (R)	Input
5,6,7,8,10,12,13,14,15	Unused	

A.7 V.35, MRAC34 ADAPTER, DB25 PINOUT

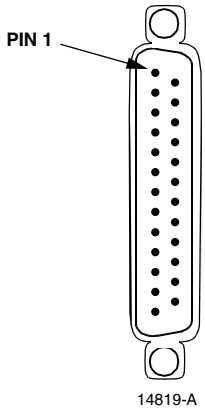


Table 7: DB25 Connector (and MRAC34 Adapter) To V.35

DB25 PINS		CCITT	CIRCUIT NAME	SOURCE
1	A		Protective GND	
2	P	(a) 103	Tx Data A	DTE
3	R	(a) 104	Rx Data A	DCE
4	C	105	RTS	DTE
5	D	106	CTS	DCE
6	E	107	DSR	DCE
7	B	102	Signal GND	
8	F	109	Rec Line Sig Det (DCD)	DCE
9	X	(b) 115	Rx Timing B	DCE
11	W	(b) 113	External clock B	DTE
12	AA	(b) 114	Tx Timing B	DCE
14	S	(b) 103	Tx Data B	DTE
15	Y	(a) 114	Tx Signal Timing A	DCE
16	T	(b) 104	Rx Data B	DCE
17	V	(a) 115	Rx Signal Timing A	DCE
18	L	141	LL (Local Loopback)	DTE
20	H	108.2	DTR	DTE
21	N	140	RL (Remote Loopback)	DTE
24	U	(a) 113	External Clk A	DTE
25	NN	142	TM (Test Mode)	DCE
10,13,19,22,23			Unused	

Note: For tail-circuit timing at this port, the 78906001 Adapter is required if the DTE does not support an external clock on pins 11 and 24.

A.8 EIA-530, DB25 PINOUT

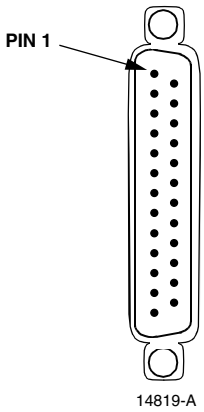
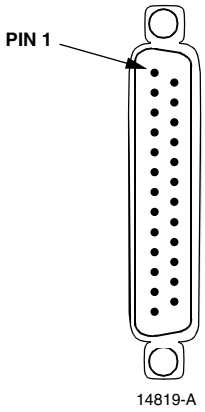


Table 8: DB25 Connector Pinout for EIA-530

PIN	DESIGNATOR CCITT/EIA	CIRCUIT NAME	SOURCE
1	—	Shield	—
2	(a) 103/BA	BA (A), Transmitted Data	DTE
3	(a) 104/BB	BB (A), Received Data A	DCE
4	(a) 105/CA	CA (A), Request To Send A (RTS)	DTE
5	(a) 106/CB	CB (A), Clear To Send A (CTS)	DCE
6	107/CC	CC (A), DCE Ready (DSR)	DCE
7	102/AB	AB, Signal Ground	DTE
8	(a) 109/CF	CF (A), Received Line Signal Detector	DCE
9	(b) 115/DD	DD (B), Receiver Signal Element Timing	DCE
10	(b) 109/CF	CF (B), Received Line Signal Detector	DCE
11	(b) 113/DA	DA (B), Transmit Signal Element Timing	DTE
12	(b) 114/DB	DB (B), Transmit Signal Element Timing	DCE
13	106/CB	CB (B), Clear To Send	DCE
14	(b) 103/BA	BA (B), Transmitted Data	DTE
15	(a) 114/DB	DB (A), Transmit Signal Element Timing	DCE
16	(b) 104/BB	BB (B), Received Data	DCE
17	(a) 115/DD	DD (A), Receiver Signal Element Timing	DCE
18	141	LL (Local Loopback)	DTE
19	(b) 105/CA	CA (B), Request To Send	DTE
20	108.2/CD	CD (A), DTE Ready	DTE
21	140	RL (Remote Loopback)	DTE
22	(b) 107/CC	CC (B), DCE Ready	DCE
23	108.2/CD	CD (B), DTE Ready	DTE
24	113/DA	DA (A), Transmit Signal Element Timing	DTE
25	142	TM (Test Mode)	DCE

A.9 DB25 TO EIA-449 (RS449), DC37 ADAPTER CABLE PINOUT

Table 9: DB25 to EIA-449 (RS499), DC37 Adapter Cable Pinout



EIA-530 DB25 PINS	EIA-449 DC37 PINS	CIRCUIT NAME
1	—	Protective ground
2	4	Tx data A
3	6	Rx data A
4	7	RTS A
5	9	CTS A
6	11	DSR A
7	19	Signal GND
8	13	Rec line sig det A (DCD)
9	26	Rx signal timing B
10	31	Rec line sig det B (DCD)
11	35	External clk B (DTE source)
12	23	Tx signal timing B
13	27	CTS B
14	22	Tx data B
15	5	Tx signal timing A
16	24	Rx data B
17	8	Rx signal timing A
18	10	LL (Local Loopback)
19	25	RTS B
20	12	DTR A
21	14	RL (Remote Loopback)
22	29	DSR B
23	30	DTR B
24	17	External clk A (DTE source)
25	18	TM (Test Mode)

A.10 HSSI PINOUT

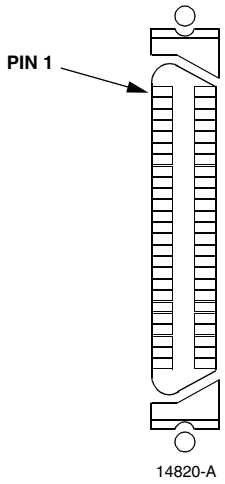


Table 10: HSSI DB-50 Pinout

PIN +	PIN -	MNEMONIC	CIRCUIT NAME
1	26	SC	Signal common
2	27	RSET-DCE	Receive Timing
3	28	DSR	DCE Ready
4	29	RDATA	Receive Data
5	30		reserved
6	31	TSET-DCE	Transmit Signal Element Timing
7	32	SC	Signal Common
8	33	DTR	DTE Ready
9	34	TSET-DTE	Transmit Signal Element Timing
10	35	LA	Loopback Circuit A
11	36	TDATA	Transmit Data
12	37	LB	Loopback Circuit B
13	38	SC	Signal Common
14-18	39-43		5 Ancillary to DCE
19	44		Signal Common
20	45	TSETIN	Kentrox defined input
21-24	46-49		4 Ancillary from DCE
25	50		Signal Common

A.11 DSX-1, DS1, AND E1 8-PIN PINOUT

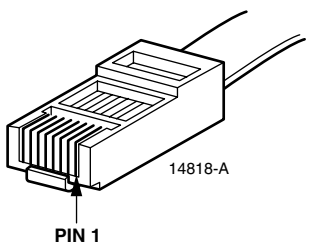


Table 11: 8-Pin Modular Connector Pinout, DSX-1 and DS1/E1

PIN NUMBER	DSX-1	DS1/E1
1	Txd Data (R)	Rxd Data (R)
2	Txd Data (T)	Rxd Data (T)
4	Rxd Data (R1)	Txd Data (R1)
5	Rxd Data (T1)	Txd Data (T1)
7,8	No connection	No connection
3,6	No connection	No connection

APPENDIX B: SUPPORTED MODULE PAIRS

Table 12 summarizes the possible combinations of PMs and PLMs. The module descriptions contain the current part number and the previous part number.

Table 12: Module Compatibility Map

	10200 CELL	10201 PACKET	10202 QUAD CELL	10203 QUAD PACKET CBR	10204 ESC	10205 QUAD PACKET	0206 QUAD ETHERNET	10207 OCTAL CES
10300 DS3	✔	✔			✔			✔
10301 HSSI		✔						✔
10302 QUAD DSX-1			✔	✔		✔		
10303 TRI V.35/EIA-530/ DSX-1		✔		✔		✔		
10304 OC-3/ STM-1 MM	✔				✔			
10305 OC-3/STM-1 SM	✔				✔			
10306 E3	✔	✔			✔			✔
10307 QUAD E1			✔	✔		✔		
10308 TRI V.35/EIA-530/E1		✔		✔		✔		
10309 QUAD V.35/EIA-530		✔		✔		✔		✔
10310 J2	✔				✔			
10311 QUAD ETHERNET							✔	
10312 QUAD IMA DS1*	✔				✔			
10313 QUAD IMA E1*	✔				✔			
10314 OCTAL DSX-1								✔
10315 OCTAL E1								✔
10317 OCTAL DS1								✔
10318 OCTAL IMA DS1	✔				✔			
10319 OCTAL IMA E1	✔				✔			
10320 QUAD TTL								✔

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* MANUFACTURING DISCONTINUED

APPENDIX C: TERMINAL SETUP

The following sections describe how to set up terminals and terminal emulators for the AAC.

C.1 VT 100 TERMINAL AND VT100 EMULATOR

When using VT100 terminal or VT100 emulator, ensure that the emulator settings are set up correctly for the AAC. Also ensure that the Function keys and Shift-Tab keys are mapped appropriately. While the AAC is tolerant of my different terminal emulators, it is a good practice to set up using these guidelines.

Note that for systems with the ISC, the DCE Comm port has autobaud capability. For systems with the SC, the general guidelines for setting up a VT100 terminal are as follows:

- Set the software to emulate a DEC VT100 terminal. (This option is available on most terminal emulation software.)
- Set the terminal emulator for 24 lines x 80 columns.
- Turn “local echo” off if it is offered as a selection.
- Turn “line wrap” off if it is offered as a selection.
- Turn “carriage return” (CR) or “carriage return/line feed” (CR-LF) translation off if it is offered as a selection.
- Set the software to full duplex connection, 8 data bits, 1 stop bit, and no parity.
- Set Xon/Xoff to “not used” if it is offered as a selection.
- Enable or disable DTR as appropriate to match the SW8 setting of the AAC COMM port DIP switches (SC only). See “SC DIP Switches” on page 100.
- Set the terminal baud rate to match the SW1 and SW2 settings of the AAC COMM port DIP switches (SC only). See “SC DIP Switches” on page 100.

Table 13: SC DIP Switches

BAUD SETTING	SW1	SW2
9600 (default)	down	down
19200	down	up
2400	up	down
38400	up	up

PARITY SETTING	SW3	SW4
none (default)	down	down
none	down	up
odd	up	down
even	up	up

DATA BITS	SW5
8 data bits per character (default)	down
7 data bits per character	up

STOP BITS	SW6
1 stop bits per character (default)	down
2 stop bits per character	up

DTR	SW8
DTR not required (default)	down
DTR required	up

If VT100 emulation is used, the Function keys and Shift-Tab may not be correctly mapped and may not work as described. (When using VT220, VT320 or VT420 terminals, set up the terminal to emulate a VT100.) The table below shows the correct mapping.

Table 14: Correct Mapping

KEY	DECIMAL MAPPING	HEX MAPPING	KEY MAPPING
F2	027 079 081	1B 4F 51	Esc O Q (O, not zero)
F7	027 079 113	1B 4F 71	Esc O q (O, not zero)
F8	027 079 114	1B 4F 72	Esc O r (O, not zero)
Shift-Tab	027 098	1B 62	Esc b

Use the PF2 (or F2) key to display a pop-up Choice List available for some fields.

If a mouse is connected with the terminal emulation program, do not use it with the native AAC user interface. The interface does not support a mouse.

C.2 USING MICROSOFT WINDOWS 95 HYPERTERMINAL

1. From the Start menu, select Program > Accessories > Hyperterminal. A window opens displaying several icons.
2. Select the icon labeled Hyperterm. If the system does not have a modem installed, a dialog box will state that a modem is required to make the connection and it asked if one is to be installed. A modem is not used to connect to the AAC, therefore select "No." A window opens labeled "Connection Description."
3. Select one of the icons and specify a name. (Once the setup is complete, clicking on this icon opens an AAC login window.) Click OK. A window opens labeled "Phone Number."
4. In the field labeled "Connect using," select the appropriate COMM port from the list. Click OK.

Set the COMM Port as shown below.

Table 15: COMM Port Settings

OPTION	SET TO…
Bits per second	9600
Data bits	8
Parity	None
Stop bits	1
Flow control	None

Click OK. A window opens. If the AAC is connected to the correct COMM port, a login prompt is displayed.

Under the View menu, choose "Font". Select "terminal" font, font style "regular" and size "9" to set the environment for the VT100 terminal emulation.

In subsequent logins, the labeled icon appears in the same window as the Hyperterm.exe icon. Click this icon to open a window session with the AAC.

C.3 USING MICROSOFT WINDOWS NT OR WINDOW 2000 HYPERTERMINAL

1. From the Start menu, select Program > Accessories > Hyperterminal (Windows NT), or Program > Accessories > Communications > Hyperterminal (Windows 2000).
2. On some systems that do not have a modem installed, a dialog box will state that a modem is required to make the connection. A modem is not used to connect to the AAC, therefore select “No.”
3. In the Connection Description dialog box, enter a name and select an icon to use for this and subsequent connection to the AAC. (Once the setup is complete, clicking on this icon opens an AAC login window.) Click OK.
4. In the field labeled “Connect using,” select the appropriate COMM port from the list. Click OK.

Set the COMM Port as shown below.

Table 16: COMM Port Settings

OPTION	SET TO…
Bits per second	9600
Data bits	8
Parity	None
Stop bits	1
Flow control	None

Click OK. A window opens. If the AAC is connected to the correct COMM port, a login prompt is displayed.

Under the View menu, choose “Font”. Select “terminal” font, font style “regular” and size “9” to set the environment for the VT100 terminal emulation.

Note: If the arrow keys do not function properly on Windows 2000 systems, you need to apply the latest Windows 2000 service pack from Microsoft.

In subsequent logins, the labeled icon appears in the same window as the Hyperterm.exe icon. Click this icon to open a window session with the AAC.